Saskatchewan
Parks and
Renewable
Resources

Fort a la Corne Wildlife Study

Wildlife Technical Report 85–4

FORT A LA CORNE WILDLIFE STUDY

Prepared by:

Rodney A. Froc

Barbara A. Hanbidge

Eike G. Scheffler

and

I. D. Systems Ltd.

Edited By:

Eunice D. Bergstrom

Sponsored By:

Saskatchewan Power Corporation, Regina, Saskatchewan

in

co-operation with the Wildlife Branch

Saskatchewan Parks and Renewable Resources

JUNE 1985

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the assistance and suggestions received from individuals of the Fisheries, Wildlife and Field Services Branches of the Department of Parks and Renewable Resources. We would also like to extend our thanks to the people from the Fort a la Corne area. Without the help of all these individuals, the Fort a la Corne Wildlife Study would not have been possible.

George Duff, Jean Oliver, Adrienne Bussiere, and Lois Koback contributed the drafting and clerical expertise.

Special thanks are extended to Dr. Doug Allen, D.V.M. and to Terry Rock, Prince Albert Regional Biologist.

TABLE OF CONTENTS

	Page
Acknowledgements	i
List of Tables	iv
List of Figures	vi
List of Photos	vii
List of Appendices	vii
1.0 INTRODUCTION	1
2.0 OBJECTIVES	3
3.0 REGIONAL SETTING	4
3.1 Location	4
3.2 Geologic History	6
3.3 History	11
3.4 Fish and Wildlife	14
3.5 Recreational Use	14
3.6 Forestry	17
4.0 METHODS	18
4.1 Biophysical	18
4.1.1 Base Map	18
4.1.2 Vegetation Map	20
4.1.3 Critical Wildlife Habitat Maps	21
4.2 Land Use	22
4.2.1 Forestry	22
4.2.1.1 Forest Inventory	22
A. Forested Productive Land	22
B. Non-Forested Productive Land	24
C. Non-Productive Land	25
D. Forest Harvest	27
4.2.1.2 Employment by the Forest Industry	27
4.2.1.3 Management	27
4.2.1.4 Access Trails Map	28
4.2.1.5 Merchantable Stands Map	29
4.2.2 Public Resource Use	29
4.2.3 Agricultural Use	30
4.3 Wildlife	30
4.3.1 Wildlife Inventory	30
4.3.2 Wildlife Harvest	33
4.3.3 Elk Trapping, Marking and Monitoring	34
5.0 RESULTS AND DISCUSSION	40

Table of Contents (cont'd)

	Page
5.1 Biophysical Mapping	40
5.1.1 Critical Wildlife Habitat on Biophysical Land Types	41
5.1.2 Major Water Bodies	63
5.1.3 Critical Wildlife Habitat Outside F.L.C.	63
5.1.4 Critical Wildlife Habitat on Cutovers	65
5.2 Land Use	65
5.2.1 Forestry	65
5.2.1.1 Forest Inventory	65
A. Forested Productive Land	65
B. Non-Forested Productive Land	67
C. Non-Productive Land	70
D. Forest Harvest	70
5.2.1.2 Silviculture	72
5.2.1.3 Access Trails	74
5.2.2 Use of F.L.C. by Local Indian Bands	75
5.2.3 Agriculture	76
5.3 Wildlife	79
5.3.1 Wildlife Inventory	79
5.3.2 Wildlife Harvest	89
5.3.3 Elk Trapping, Marking and Monitoring	94
6.0 SUMMARY	101
REFERENCES CITED	102
APPENDICES	106

LIST OF TABLES

Table		Page
1	Terminology Used in the Description of Forested Productive Land in F.L.C.	23
2	Area of Land Types on the Base Map of F.L.C.	42
3	Area of Vegetation Types in F.L.C.	43
4	Area of Cutovers and Silvicultural Areas by Land Type in F.L.C.	45
5	Approximate Areas of Seasonal Critical Elk Habitat According to Land Types in F.L.C.	46
6	Approximate Areas of Critical Wildlife Habitat According to Land Types in F.L.C.	47
7	Area of Critical Wildlife Habitat by Species and Land Type on Cutovers and Silvicultural Areas in F.L.C.	48
8	Approximate Areas of Critical Wildlife Habitat Adjacent to F.L.C.	64
9	Major Species Composition of Softwood, Mixedwood and Hardwood Stands in F.L.C.	66
10	Canopy Densities and Height Classes of Forested Productive Stands in F.L.C.	68
11	Summary of Forest Fires Within F.L.C. From 1943 to Present	69
12	Areas of Land Types Non-Productive for Forestry ..	70
13	Annual Timber Quotas for F.L.C. as of 1985	71
14	Summary of Recent Silviculture Activities in F.L.C.	73
15	Total Length of Access Roads in F.L.C.	74
16	Seasonal Employment by Forestry Industry in F.L.C.	75
17	Summary of Responses to Questionnaire Regarding Use of F.L.C. - Muskoday Band	77
18	Summary of Responses to Questionnaire Regarding Use of F.L.C. - James Smith Band	78

List of Tables (cont'd)

Table		Page
19	Total Area and Number of Grazing Leases and Number of Animals Grazed in F.L.C. by Enforcement District	79
20	Number of Animals Observed in Each Stratum During the February 1983 Aerial Survey of F.L.C.	80
21	Numbers and Percentages of Elk and Moose Observed in Each Cover Type/Density During the F.L.C. Aerial Survey February 1983	82
22	Age/Sex Distribution of Elk and Moose in F.L.C. as Observed During December 1983 Aerial Survey	83
23	Results of Waterfowl Brood Survey Conducted Between LaColle Rapids and the East Boundary of F.L.C., July 23 and 24, 1983	87
24	Number of Licences for Moose and Elk Issued Under the Draw System Since Initiated	90
25	Telephone Questionnaire Results - Harvest Data for Elk and Moose Hunters in F.L.C.	92
26	Telephone Questionnaire Results - Harvest Data for the 1982 and 1983 Special Elk Seasons in F.L.C. ..	93
27	Fur Harvest Totals for Trapping Block P-85 in F.L.C. From 1966 to 1982	95
28	Description and Current Status of Elk Trapped in F.L.C. During the Winters of 1982-83 and 1983-84 (Both Radio-Collared and Canvas-Collared Animals) .	96

LIST OF FIGURES

Figure		Page
1	Location of Nipawin Hydro-Electric Project	2
2	Location of F.L.C. in Relation to Physiographic Divisions of the Prince Albert (73H) Map Area	5
3	Location of F.L.C. in Relation to Local Game Management Zones, Rural Municipalities, Highways, Urban Centers, and Saskatchewan Soil Zones	7
4	Map of F.L.C. Showing Location of Provincial Highways, Secondary Roads, Fire Towers, Campgrounds, D.P.R.R. Enforcement District Boundaries, Indian Reserves, Location of the Francois-Finlay Dam and the Proposed Full Supply Level	8
5	Delineation of Trapping Block P-85 and Its Ten Subdivisions	9
6	History of Deglaciation of Saskatchewan a) About 12,000 Yrs. Ago; b) About 11,500 Years Ago	10
7	History of Deglaciation of Saskatchewan a) About 11,000 Years Ago; b) About 10,000 Years Ago	12
8	Map of F.L.C. Showing Location of Grazing Leases, Wild Rice Lease, IBP-CT Site and Site of Proposed Ecological Reserve	13
9	Map of Campgrounds, Stocked Creeks, Cross-Country Ski Trails and Downhill Ski Area in F.L.C.	16
10	F.L.C. Map Showing Stratified Random Sampling Blocks Flown for Elk Survey, February 1983	32
11	Overhead View of Elk Traps Used in F.L.C.	36
12	Trigger Mechanism Used on Elk Traps in F.L.C.	39
13	Histograms Showing Elk Herd Size or Aggregates in Each of the Three Stratum in F.L.C. Aerial Survey, February, 1981	81
14	Age Structure of Live Trapped Elk	84
15	Elk Hunter Kill Data, 1982 and 1983	85

LIST OF APPENDICES

Appendix		Page
1	List of Mammals Found in F.L.C. and Relative Abundance Ratings	106
2	List of Bird Species Found in and Adjacent to F.L.C., Their Relative Abundance, and Nesting Frequency Ratings Where Applicable	108
3	List of Reptiles and Amphibians Found in F.L.C. .	116
4	List of Fish Found in the F.L.C. Area	117
5	List of Plant Species Found in F.L.C.	118
6	Letter of Introduction Regarding F.L.C. Study to James Smith and Muskoday Indian Bands	120
7	Outline of F.L.C. Wildlife Study/Master Plan	121
8	Field Data Sheets for F.L.C. Wildlife Study/Master Plan	124
9	a) Letter of Response From James Smith Indian Band	127
	b) Letter of Response From Muskoday Indian Band .	130

LIST OF PHOTOS

Photo		
1	Trap Constructed for Elk Monitoring Study	35
2	Chute Used for Handling Captured Elk	35

1.0 INTRODUCTION

A proposal for a hydroelectric power station on the Saskatchewan River near the town of Nipawin was developed by the Saskatchewan Power Corporation (S.P.C.) in 1977 (Figure 1). Comprehensive environmental studies were conducted in conjunction with that proposal. Evaluation of these studies by the Poplar River - Nipawin Board of Inquiry resulted in the recommendation that while there was no compelling reason that the project should not proceed, S.P.C. should reconsider the project design in view of environmental concerns associated with the development. The recommendation was based largely on local objections to the proximity of the proposed site of the dam and powerhouse to hospital facilities, a senior citizens' home, cemetaries and a food processing plant. Because of the suggested relocation, an environmental update was completed in 1980.

In 1981, S.P.C. was given conditional environmental approval by Saskatchewan Environment to construct the 40 meter high Francois-Finlay Dam across the Saskatchewan River, 5 km upstream from the town of Nipawin. The Nipawin hydro-electric development will produce 252 megawatts when it is completed in late 1985.

The impoundment created by the dam will be known as Codette Reservoir. It will extend approximately 65 km upstream from the dam and have a capacity of 400 million cubic meters at its full supply level (f.s.l.) of 348 m above sea level (a.s.l.) (S.P.C. April 1983). The reservoir will flood areas presently used for agriculture as well as forested land. Fifteen hundred hectares were cleared, 597 ha of which is within the Fort à la Corne Provincial Forest and Wildlife Management Unit (F.L.C.) (S.P.C. 1983).

In conjunction with the Nipawin hydro-electric project, S.P.C. is constructing a 230 kilovolt transmission line from Codette to Beatty. The right-of-way will run a distance of 12.8 km within the eastern portion of F.L.C. south of the Saskatchewan River. About 4 km of the route is along the edge of F.L.C. while the remaining 8.8 km angle through it

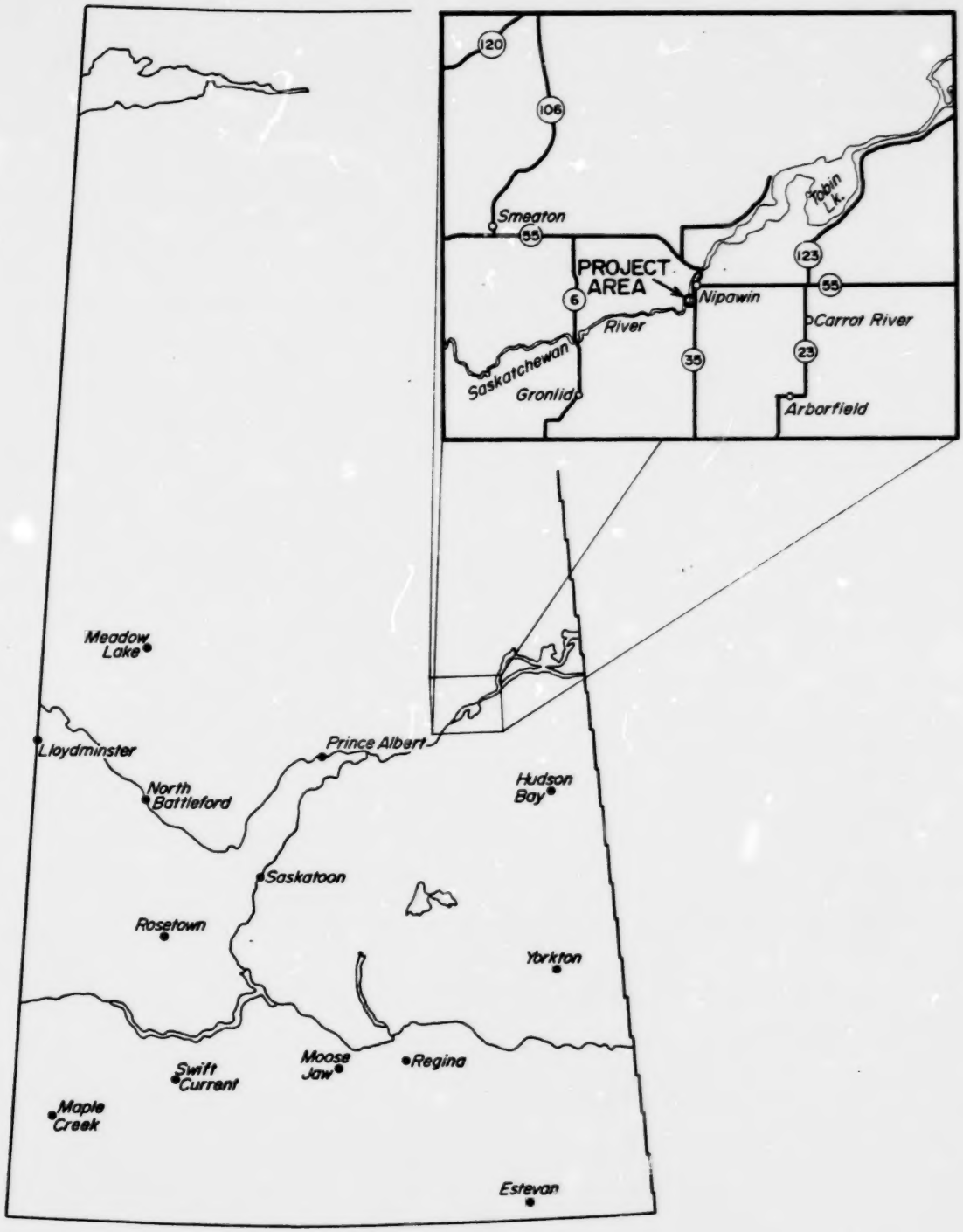


Figure I. Location of Nipawin hydro electric project.

(Morrison pers. comm.). The right-of-way clearing and transmission line construction will be completed in 1985-86.

Environmental approval for the hydro development required S.P.C. to sponsor a Wildlife Master Plan for F.L.C. Previous baseline studies (Blood et al 1977: Polson and Rasmussen 1982; Pipe 1982) pointed out that of the four resident ungulate populations, elk *(Cervus elaphus)* would be most affected by the terrestrial habitat loss resulting from the flooding. Elk, because they are very valuable to provincial residents for both consumptive and non-consumptive use, were singled out as the most important animal in F.L.C. requiring attention in terms of mitigation and population management.

2.0 OBJECTIVES

Development of the Wildlife Master Plan had three principal objectives. These were:

1) Identify wildlife species of particular importance in the F.L.C. area which are used for consumptive and non-consumptive purposes;
2) Identify the impacts on wildlife of resource developments, particularly the S.P.C. dam and reservoir; and
3) Recommend ways for protecting and monitoring the wildlife populations.

The study team undertook the following activities to prepare the Master Plan:

- biophysical mapping to depict critical wildlife ranges, soils and vegetation;
- land use mapping showing forestry activities, fire history, road systems, and related resource use patterns;
- updating and refining of wildlife inventory information with particular emphasis on elk and other ungulates;

- monitoring and documenting of all primary and secondary resource use by humans including hunting, logging, recreation, agricultural practices, and hydro dam-related activities (reservoir clearing), to ascertain their influence on wildlife populations; and
- proposing mitigative actions necessary to counteract habitat losses as a result of all resource uses including S.P.C.'s developments, and strategies for the improvement of wildlife populations. These recommendations will be presented as a master plan in a second report.

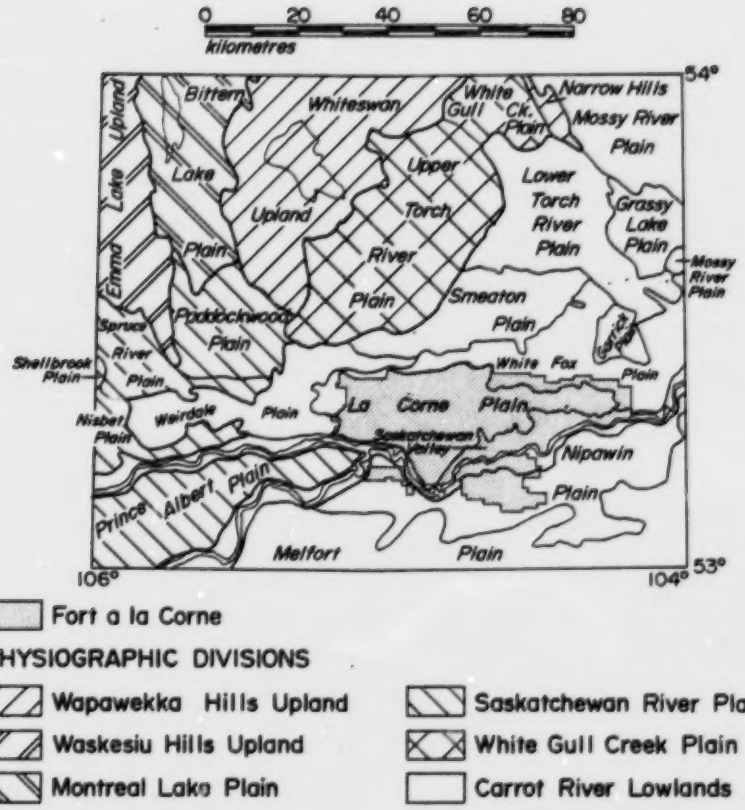
3.0 REGIONAL SETTING

3.1 Location

F.L.C. is a 1307.7 km^2 island of forest surrounded by agricultural land. The F.L.C. area extends along the interface of the Southern Boreal (mixedwood) Forest and Aspen Grove Parkland. Due to its transition zone location, there is a high degree of habitat and faunal diversity. Many species reach their southern or northern distribution limits in this vicinity (Richards and Fung 1969). The F.L.C. is found in the Carrot River Lowlands, a physiographic sub-section of the Plains Region of the Great Plains Province of North America (Figure 2).

The uplands slope from 457 m elevation a.s.l. in the western portions to 427 m in the east. The major topographic relief is provided by the North Saskatchewan and Saskatchewan River Valleys which divide the area. Within the valley, there are changes in elevation from 427 m a.s.l. in the west to less than 325 m on the lowest eastern alluvial terraces (Anderson 1976). Within F.L.C. the topography is very gently undulating to strongly rolling.

The F.L.C. area lies within five rural municipalities: Garden River, Torch River, Willow Creek, Kinistino, and Nipawin. It is accessible by Highway 55 from the north, Highways 3 and 335 from the south, Highway 35 to the east, and Highway 6 which divides the area into east



Fort a la Corne

PHYSIOGRAPHIC DIVISIONS

- Wapawekka Hills Upland
- Waskesiu Hills Upland
- Montreal Lake Plain
- Saskatchewan River Plains
- White Gull Creek Plain
- Carrot River Lowlands

Figure 2. Location of F.L.C. in Relation to Physiographic Divisions of the Prince Albert (73H) Map Area (Anderson and Ellis, 1976).

and west blocks (Figure 3).

There are no urban centers within F.L.C. but there are a number within a 50 km radius. The largest are the cities of Prince Albert and Melfort and the towns of Choiceland and Nipawin.

The renewable resources of F.L.C. are the responsibility of the Department of Parks and Renewable Resources (D.P.R.R.) and are administered by the Prince Albert Region headquartered in Prince Albert. F.L.C. falls within three enforcement districts in the Prince Albert Region. The regional offices are in Nipawin, Melfort, and Prince Albert. All of F.L.C. is in Game Management Zone 50 (Figure 3).

Three Indian reserves, Muskoday (#99), James Smith (#100), and Cumberland (#100A) are close to F.L.C. (Figure 4) and use F.L.C. as their traditional trapping and hunting area. James Smith and Cumberland function as one reserve and hold exclusive rights to Trapping Block P-85, which is comprised of that portion of F.L.C. north of the North Saskatchewan and Saskatchewan Rivers. It is administered as a Fur Conservation Area and is subdivided into ten zones (Figure 5).

The climate of F.L.C. is classified as cold sub-humid continental, characterized by cool short summers, long cold winters, and low annual precipitation. The meteorological records of Choiceland, Nipawin, Melfort, and Prince Albert were used as there are no weather stations in F.L.C. The mean daily temperature of July, the warmest month, ranges from 17.6^{o}C to 18.9^{o}C while the mean daily temperature of January, the coldest month, ranges from -20.3^{o}C to -19.1^{o}C. Mean total precipitation ranges from 400.1 to 451.6 mm. The frost free season varies from 89 to 92 days (Richards and Fung 1969).

3.2 Geologic History

Approximately 11,500 years ago, water flowed through the North Saskatchewan Spillway and through the Shellbrook, Sturgeon, and Spruce Channels into glacial Lake Saskatchewan. Lake Saskatchewan then drained into Lake Agassiz (Figure 6). The stratigraphy of glacial Lake Saskatchewan sediments indicates that most of the water replenishing the lake was

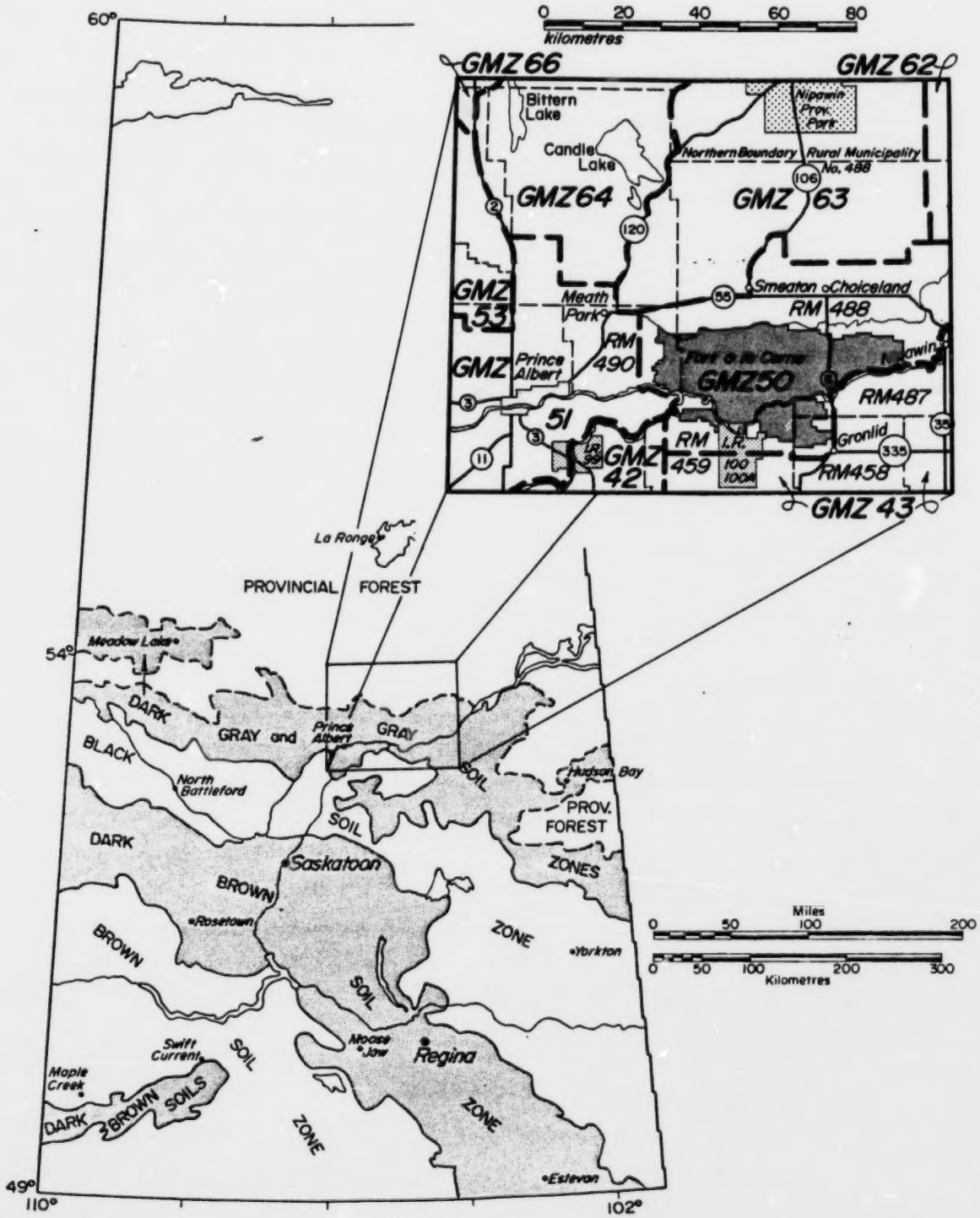


Figure 3. Location of F.L.C. in Relation to Local Game Management Zones, Rural Municipalities, Highways, Urban Centers, and Saskatchewan Soil Zones.

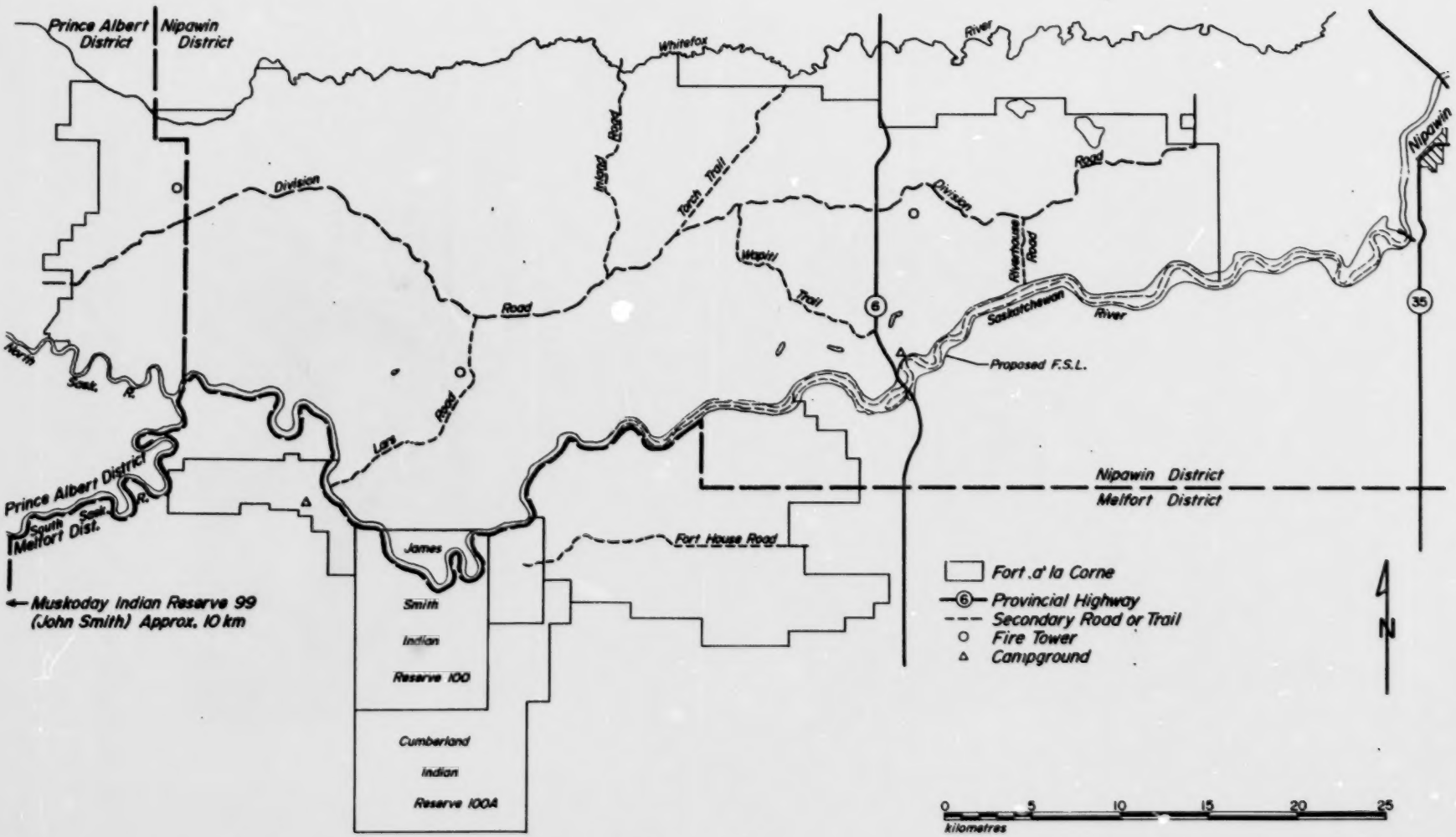


Figure 4. Map of F.L.C. showing location of provincial highways, secondary roads, fire towers, campgrounds, D.P.R.R. Enforcement District boundaries, Indian reserves, location of the Francois-Finlay Dam and the proposed Full Supply Level (F.S.L.).

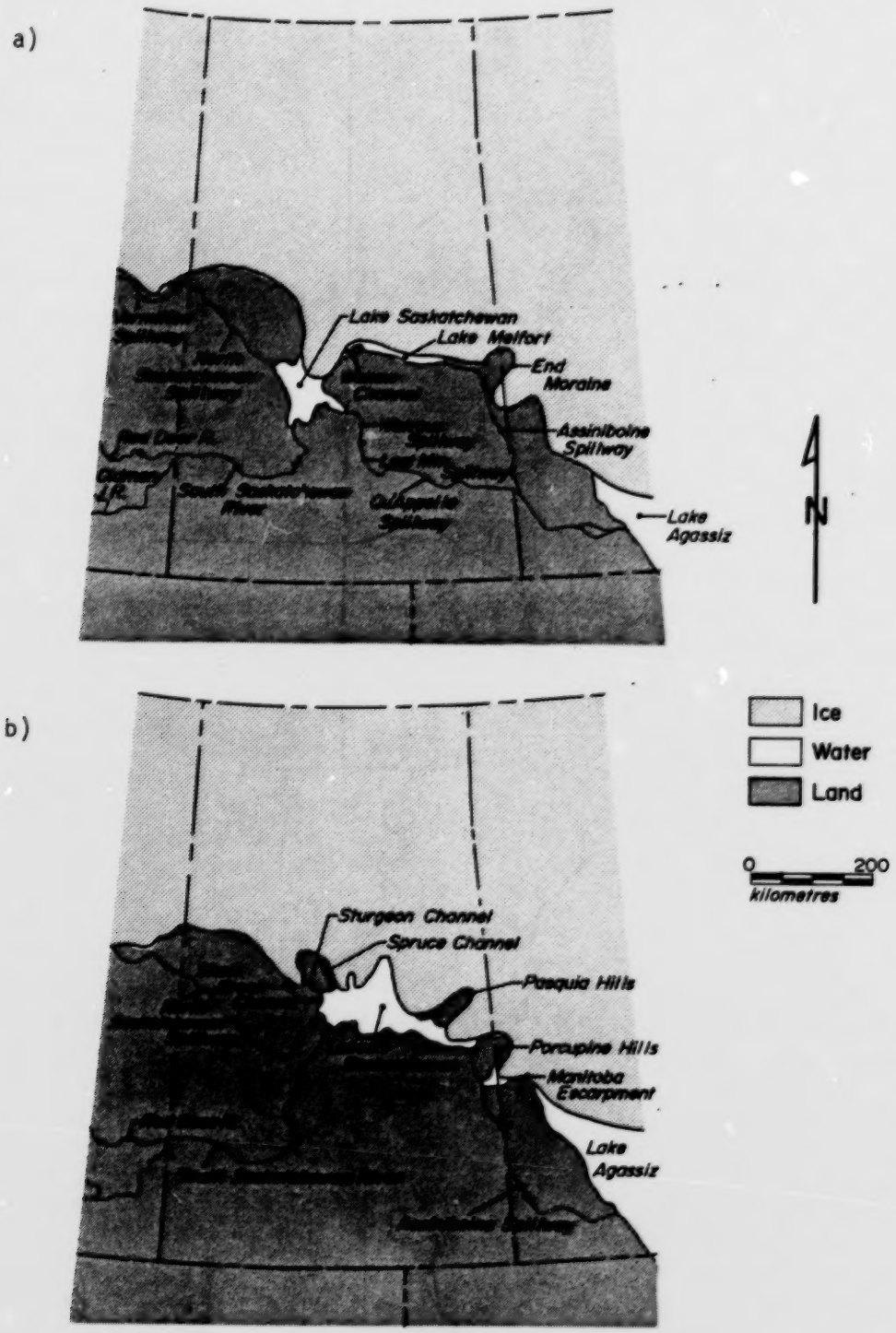


Figure 6. History of Deglaciation of Saskatchewan: a) About 12,000 Years Ago, b) About 11,500 Years Ago (Christiansen, 1979).

extraglacial via the spillways and channels mentioned above and not from the melting continental glacier. This suggests that much of the glacier had disappeared by down-melting prior to major retreat of the glacial margin. Lake Saskatchewan ceased to exist about 11,000 years ago as the glacier retreated down the northeast slope of the Manitoba escarpment (Figure 7).

Glacial Lake Agassiz advanced and the shoreline reached the area previously covered by Lake Saskatchewan. The deltaic, fluvial and lacustrine material deposited here by the Saskatchewan River is the parent material of present-day soils of the study area (Christiansen 1979).

F.L.C. is now entirely within the drainage basin of the Saskatchewan Rivers. The north portion of F.L.C. is drained by the White Fox River which also forms part of the northern boundary. The White Fox flows into the Torch River, which joins the Saskatchewan downstream from Tobin Lake. The central and southern portions of F.L.C. have many small drainages, most of which empty directly into either the North Saskatchewan or the Saskatchewan River. The one exception is in the extreme southeast corner. Drainage here is via Sandhill Creek, which flows into the Carrot River. The Carrot River flows into the Saskatchewan River at a point upstream from The Pas, Manitoba.

3.3 History

Prior to 1913, F.L.C. was administered by the federal government as a Forest Reserve. After this date the area was designated as a Game Preserve under provincial jurisdiction. The status changed to that of Provincial Forest and Wildlife Management Unit in 1970 with Order-in-Council #764, administered by the Wildlife Branch and Forestry Branch of Saskatchewan Parks and Renewable Resources.

A portion of F.L.C. was inventoried by the International Biological Program - Conservation Terrestrial Section as IBP-CT Site 71-36 in 1972 (Figure 8) and designated as a Representative Area for Southern Boreal Forest - Mixedwood Region (Cranna and Rowe 1974).

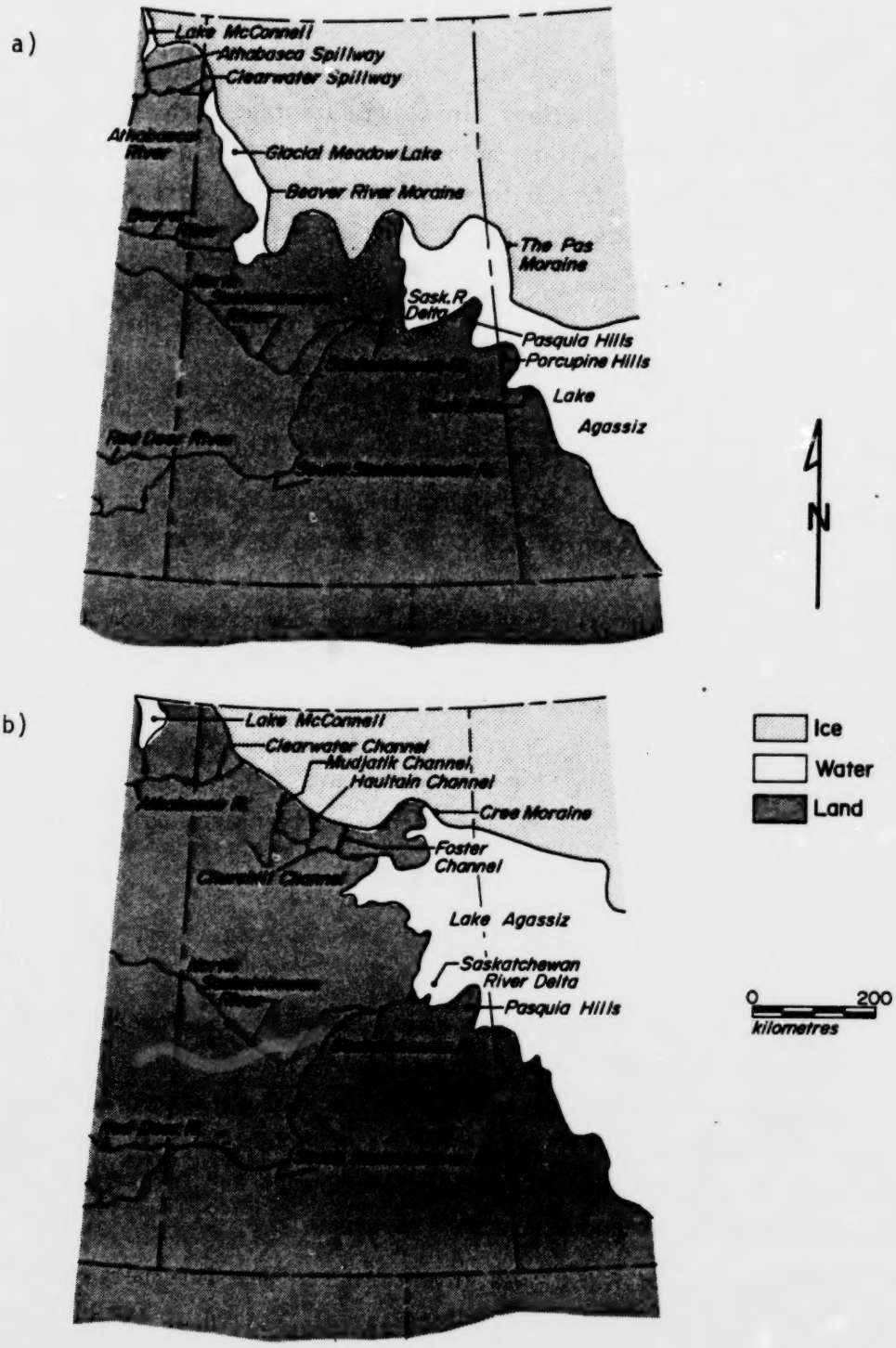


Figure 7. History of Deglaciation of Saskatchewan: a) About 11,000 Years Ago, b) About 10,000 Years Ago (Christiansen, 1979).

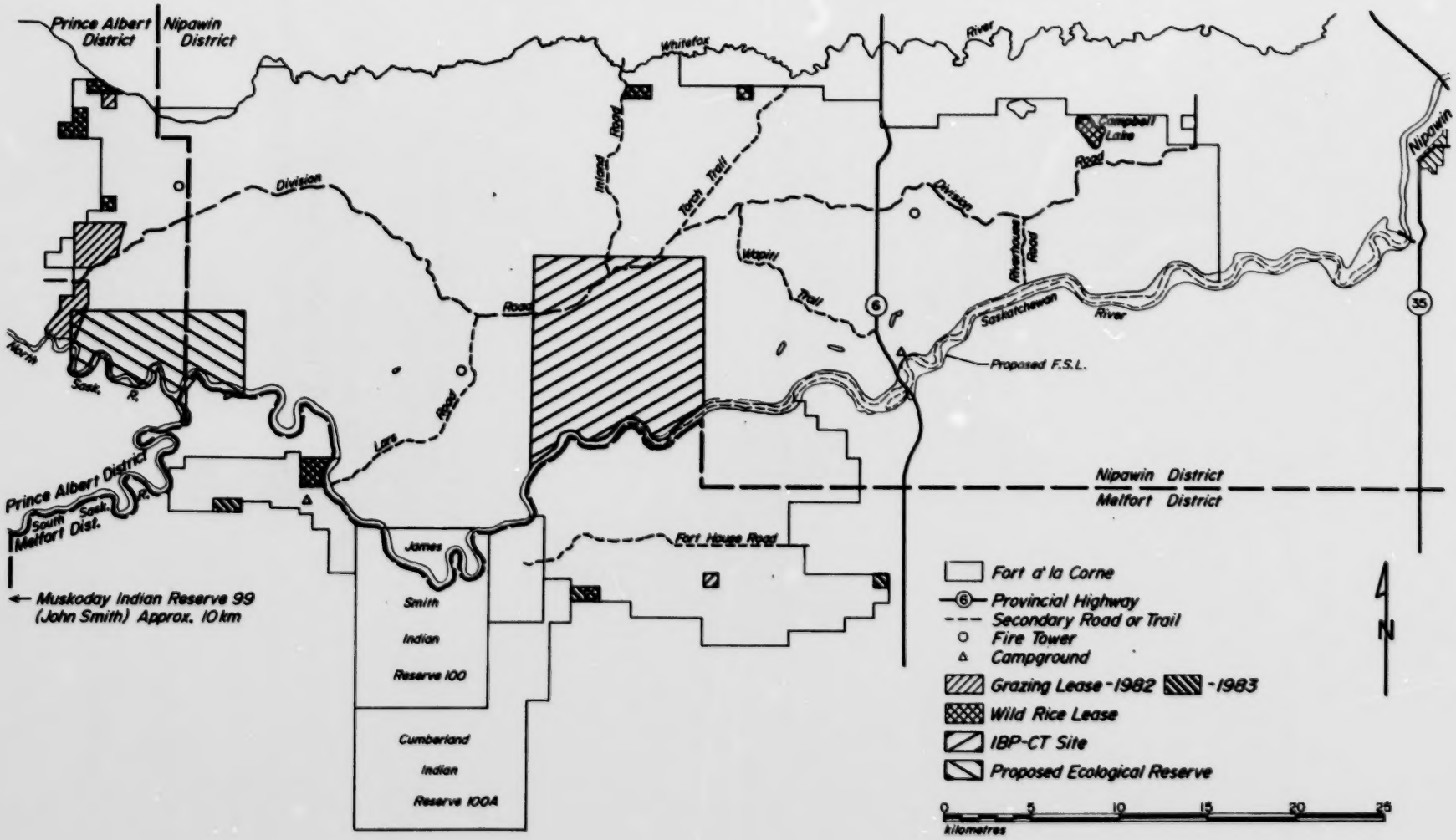


Figure 8. Map of F.L.C. Showing Location of Grazing Leases, Wild Rice Lease, IBP-CT Site and Site of Proposed Ecological Reserve.

A second area north of and including the Saskatchewan River Forks was proposed for Ecological Reserve status by the Canadian Society of Environmental Biologists (C.S.E.B.), Saskatchewan Chapter. They recommended in 1980 that the area be investigated under a Southern Boreal Forest - Mixedwood designation (Schmidt pers. comm.) (Figure 8).

3.4 Fish and Wildlife

Forty-five species of native mammals (Appendix 1), excluding the bats, occur in the region (Blood et al 1977). Five of those are restricted to uplands adjacent to the valley, leaving 40 species which may be affected by the project. The native mammals include four ungulate species, elk, moose *(Alces alces)*, white-tailed deer *(Odocoileus virginianus)*, and low numbers of mule deer *(Odocoileus hemionus)*. F.L.C. is considered most important for elk, as the elk populations in this area are the highest in the province. Eighteen species of furbearers, which are trapped by local people, also occur in the area.

Two hundred and forty-nine species of birds have been listed for the Nipawin district (Blood et al 1977) (Appendix 2). Two hundred and three of these were seen within the valley, one hundred and seven of which breed, at least in some years, in the area of the proposed reservoir. Another 11 species are known to breed in the valley between Nipawin and Tobin Lake. The remaining species occur either as migrants or non-breeding summer or winter visitors.

Found also in F.L.C. are 5 amphibians and one reptile species (Blood et al 1977) (Appendix 3).

Thirty-one species of fish are found in the area (Appendix 4) (Atton and Merkowsky 1983). The total includes rainbow trout *(Salmo gairdneri)* and brook trout *(Salvelinus fontinalis)* which are stocked in various drainages in F.L.C.

3.5 Recreational Use

Overlap among the various resource users occurs in many areas of

F.L.C. For example, there is both regulated and unregulated hunting of the three major ungulates, white-tailed deer, moose and elk. F.L.C. also provides good opportunities for black bear *(Ursus americanus)* hunting in both spring and fall.

Trapping rights in Trapping Block P-85, which encompasses most of the F.L.C. area, belong exclusively to 20 trappers from the James Smith and Cumberland Indian reserves.

Four streams in F.L.C. have been stocked with trout annually and are popular spots for local fishermen (Figure 9). Two of the streams, Bergren and English Creek, are north of the Saskatchewan River and are in the Nipawin District. Bergren is stocked with rainbow trout while English is stocked with brook trout. Shapytka Creek, south of the Saskatchewan River in the Nipawin District is stocked with brook trout. Lars Creek, lying south of the river in the Melfort District, is also stocked with brook trout.

The Saskatchewan River provides anglers with six species of game fish. The river has a "No Consumption" or "Limited Consumption" designation because of high levels of mercury.

Residents from areas adjacent to F.L.C., as well as people from nearby towns, use the area for summer and winter recreation. Summer activities include hiking, camping (Lars and Wapiti Campgrounds), fishing, and berry-picking. During the fall and winter months, hunting, cross-country skiing, and snowmobiling are popular.

Three groomed cross-country ski trails located south of the Saskatchewan River were operated for the first time during the winter 1982-83. Two trails are in the Melfort District and one is in the Nipawin District.

A downhill ski facility has been constructed by the Wapiti Valley Ski Association. The ski hill, immediately southeast of the George Willis Bridge on Highway 6, opened early in 1984 (Figure 9).

Access due to logging roads is extensive on a year-round basis, and recreational use and demands on F.L.C. appears to be increasing

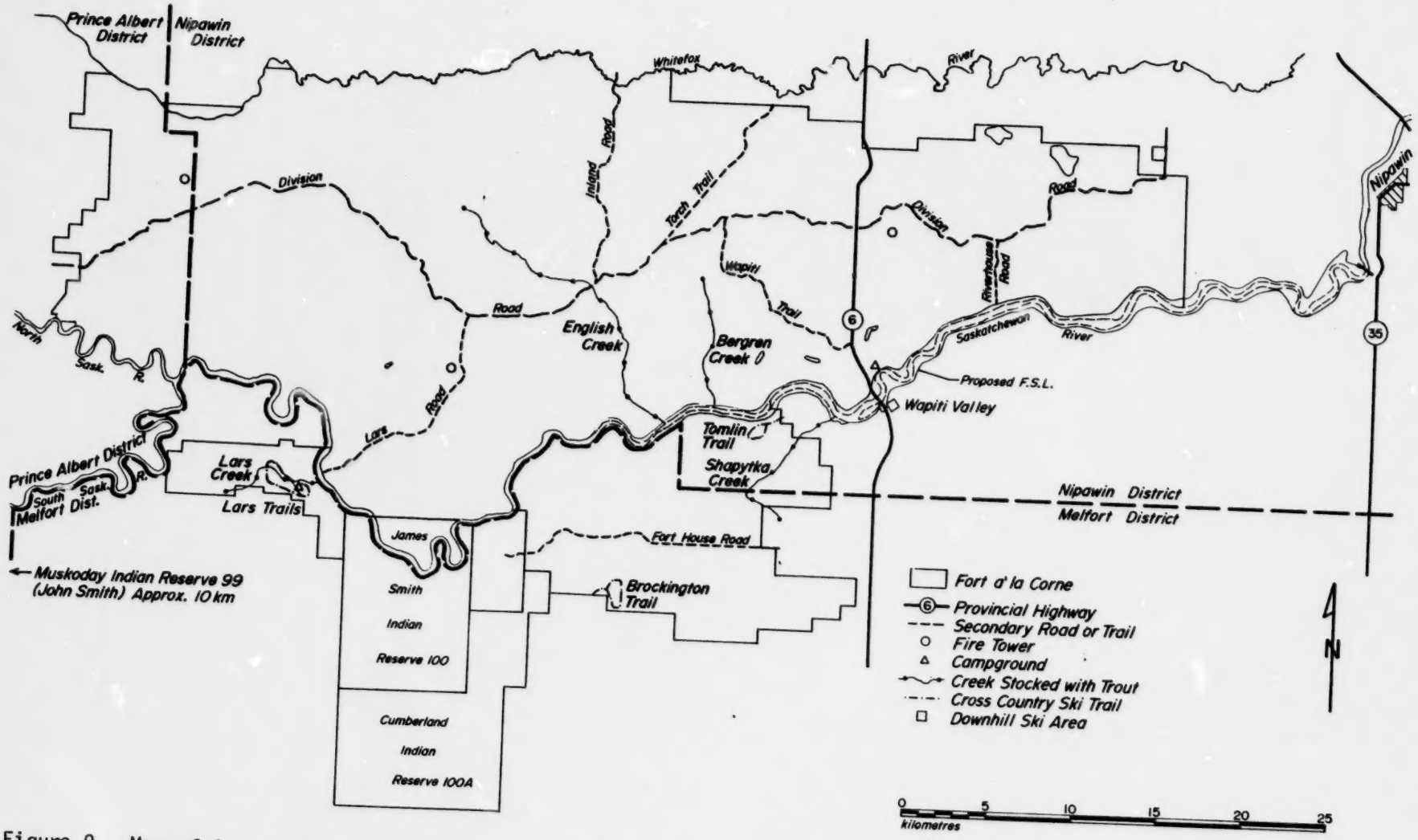


Figure 9. Map of Campgrounds, Stocked Creeks, Cross-Country Ski Trails and the Downhill Ski Area in F.L.C.

rapidly (Franson pers. comm.).

3.6 Forestry

F.L.C. has been a source of wood for commercial cutting operations and for personal use for many years.

The commercial tree species found in the area are: jack pine *(Pinus banksiana)*, white spruce *(Picea glauca)*, black spruce *(P. mariana)*, tamarack *(Larix laricina)*, balsam fir *(Abies balsamea)*, trembling aspen *(Populus tremuloides)*, balsam poplar *(P. balsamifera)* and white birch *(Betula papyrifera)* (Appendix 5).

The most extensive commercial forestry use in F.L.C. occurred after the Prince Albert Pulpwood Company (P.A.P.C.O.) opened a pulp mill at Prince Albert in 1967. From then until 1974 large areas in F.L.C., most of which are east of Highway 6, were clearcut for pulpwood. P.A.P.C.O. has since been cutting on a smaller scale, following quotas set out in a 1976 management plan.

This management plan specified that the maximum size for cutting blocks was 40 ha (100 acres), except for areas of high dwarf mistletoe *(Arceuthobium americanum)* infestation, where larger blocks could be removed. Leave blocks were of similar size, and were to be harvested later, the time of harvest dependent on the regeneration rate of the cutovers.

A new forestry management plan is currently being developed, and should be finalized in 1985.

Permits for haying, grazing, growing wild rice, and for wood cutting for personal or commercial use can be obtained at the discretion of Forestry Branch, D.P.R.R. Although ultimate approval of all permits is within the jurisdiction of the Forestry Branch, Regional offices of D.P.R.R. act as an issuing agency of permits for haying, grazing and wood cutting for personal use. Wood cutting permits for personal use are available to those who farm within 4.8 km of the forest, for a set amount of white spruce and jack pine.

Up until the summer of 1982, five fire towers were operated in

F.L.C.: Beaver House, English Cabin, Elk House, Lars, and Fort House. These towers are no longer functional and three new towers are now in use (Figure 9).

The major event in recent "burn history" of F.L.C. is the 1967 Triple-Steep Hill Fire which burned 9395.7 ha. The burn stretched from the Saskatchewan River to the northern boundary of the forest. Since this major fire, there has been only one fire over 55 ha in size.

The fire suppression policy for F.L.C. is to suppress all fires as quickly as possible. Fires outside F.L.C. will not be acted on unless the forest inside F.L.C. is being threatened (Lungull pers. comm.).

4.0 METHODS

4.1 Biophysical

4.1.1 Base Map

Soils in F.L.C. were placed in nine groups using *Soils of the Provincial Forest in the Prince Albert Map Area (73H)* (Anderson and Ellis 1976). Soils classification for the purposes of this study was taken only to the soil association level. Soil texture classes, land forms, and slope classes have also been mapped.

The four main soil associations in F.L.C. are the Nisbet, La Corne, Porcupine Plain and the Pine Association. The classification of these four associations have been altered to maintain consistency with the Terrestrial Wildlife Habitat Inventory (Flory & Schmidt 1982) for the rest of the province. Soils of the Nisbet Association are mapped as Fluvial-Lacustrine lands, La Corne and Porcupine Plain Associations are mapped as Lacustrine, and the Pine Association as Aeolian lands.

These three land types are defined as follows:

Fluvial-Lacustrine (FL) - lands formed by glacial, fluvial-Lacustrine sand deposits (Nisbet Association).

Lacustrine (L) - lands formed by fine to medium textured glaciolacustrine deposits (La Corne and Porcupine Plain Associations).

Aeolian (A) - lands formed by glacial sand deposits subsequently reworked by wind; areas with more relief characterized by dunes (Pine Association).

There are also eroded soils, alluvial soils, organic soils, drainages and a drainage meltwater channel complex. These land types are defined as follows:

Eroded (Er) - strongly dissected lands mostly adjacent to major valleys; this also includes areas of slumping.

Drainage (D) - complex assemblages of land associated with usually meandering streams; comprised of various alluvial deposits and other features of active floodplains and associated valleys.

Alluvium (Av) - lands formed largely by five textured alluvial deposits; frequently flat and poorly drained.

Fen (OF) - organic land formed by a thick accumulation of sedge-peat, enriched by circulation of slow moving slightly acidic to alkaline soil-water.

Bog (OB) - organic land formed by a thick accumulation of sphagnum moss-peat associated with stagnant, nutrient-poor water which is strongly acidic.

One classification is sub-dominant. The term meltwater channel (MC) denotes a U-shaped valley comprised of glacial spillways, frequently characterized by eroded walls, alluvial deposits, lakes and streams. The meltwater channel does not occur on its own, only in the form of a complex with a drainage (D-MC).

Bogs and Fens are comprised mainly of peat while the soils in alluvial areas have been moved in from a variety of other textural areas by water movement or are made up of decomposing plant matter. Both Eroded lands and Drainages have soil textures that differ depending on the land

forms. Five different land types on the base map have not been given soil texture classes.

In an instance where one of Bogs, Fens or Alluvium is complexed with Aeolian, Lacustrine or Fluvial-Lacustrine land, the latter three will have land form, slope and texture information listed. If the complex is with Drainages or Eroded lands, there will be only land form and slope information. Bogs, Fens and Alluvial areas are recent deposits and have been built up on already existing soils in areas with little slope. Because of these reasons there are no land form or slope information for these lands.

The Base Map is at a 1:50,000 scale on Universal Transverse Mercator (U.T.M.) maps 73H/1, 73H/2, 73H/3, 73H/6, 73H/7, 73H/8. The actual transfer of data was from the soils map (Anderson and Ellis 1976) to 1:20,000 scale False-Infra-Red air photographs. After transfer to the photos, all boundaries were checked stereoscopically and necessary changes and reclassifications made. Data were then transferred to 1:50,000 U.T.M. maps before field checks were started. Field checks for the Base Map and for the Vegetation map were done concurrently.

Area determination for all maps was done using the Numonics 1200 Series Electronic Planimeter.

4.1.2. Vegetation Map

All of the overstory in F.L.C. was grouped by species, on 1:25,000 Forest Inventory maps (Forestry Branch, D.P.R.R.). These units or groupings were transferred to 1:50,000 U.T.M. maps and then individual units were field checked (see Appendix 6 for field data sheets). The final Vegetation Map shows only the dominant overstory species while the text of the report also deals with the understory species. Field work was of an initial reconnaissance nature. Overstory species mapped were: tA - trembling aspen; bP - balsam poplar; wB - white birch; jP - jack pine; wS - white spruce; bS - black spruce; tL - tamarack; Sa - willow *(Salix* spp.*)*; and Ca - sedges *(Carex* spp.*)*.

Other map units that appear on the vegetation map are:

m - open grassed meadows - occur in complex with either jack pine, aspen or a combination of the two;

cutovers - areas that have been logged over within the last twenty years and show up as areas of low regrowth on forest inventory maps;

silvicultural areas - cutovers that have either been scarified or planted;

(B) - burnt - areas of younger seral stages than the surrounding areas as a result of forest fires; and

s - areas of younger seral stages than the surrounding areas as a result of logging operations. Cutover areas are no longer indicated as such after the regrowth reaches 5 m in height. Even though there is regrowth, the seral stage is still younger than the surrounding stands and will have different wildlife implications.

Dominant species in a stand were mapped. If a second species made up 30-40% of the stand it was mapped as subdominant (eg. jP-tA). If two species were present in equal amounts, the stand was labelled as jP+tA.

4.1.3 Critical Wildlife Habitat Maps

The Critical Wildlife Habitat Map for elk was developed from the results of an elk movement monitoring program (discussed in Section 5.3.3). Animal locations and movements over the two year period were mapped and incorporated with information from a stratified random block survey, a sex and age survey, and related field observations.

All of F.L.C. is critical habitat for elk when compared to the adjacent agricultural land; however, some areas are more important to elk than others.

Primary spring critical range is range which has the highest

spring concentrations of animals while secondary spring critical range indicates areas less frequently used or areas of lower animal concentrations. Primary and secondary winter critical habitat was mapped on the same basis as that for spring habitat.

Critical wildlife habitats for other species were determined by field observations and aerial survey information.

After the maps were compiled, total areas of critical habitat were determined as well as areas of critical habitat by land type.

4.2 Land Use

4.2.1 Forestry

4.2.1.1 Forest Inventory

All area information for forestry was based on data obtained from Forestry Branch, D.P.R.R. files.

The history of cutovers, plantations, and fires in F.L.C. was documented to show past use and to aid determination of future growth patterns and potential use.

Classifications used in this report for species, stand, and ground cover description are the same as those used by D.P.R.R. Forestry Branch.

A. Forested Productive Land

Forested productive land in F.L.C. was analyzed separately by crown closure and by height class. These classes are as follows:

Crown Closure Classes:		Height Classes:	
A	10 - 30%	5	2.5 - 7.5 m
B	30 - 55%	10	7.5 - 12.5 m
C	55 - 80%	15	12.5 - 17.5 m
D	80%+	20	17.5 - 22.5 m

Understory species have not been tabulated and secondary species have been grouped under "others". Understory species are only mapped on the forest

inventory maps when they are discernible on the aerial photos. Since they cannot always be seen and are not always mapped, aerial totals would be incomplete.

A secondary species can either be the main species for a small number of stands, or one species contributing greater than 10% of the volume of a particular stand. While the presence of a secondary species in a stand will be listed on the forest inventory map, it has no effect on the primary species association classification (ie. wStA, wStA-jP, and wStA-bS are all listed under wStA). If the secondary species makes up the entire stand but the number of these stands is small, the stand is included under the "others" category for volume.

Volumes were calculated under the categories of Hardwoods (H), Hardwood Dominant Mixedwoods (HS), Softwood Dominant Mixedwoods (SH), and Softwoods (S). The primary species in each category are listed in Table 1.

Table 1. Terminology used in the description of Forested Productive Land in Fort a la Corne (Forestry Branch Files, D.P.R.R. Prince Albert, Sask.).

Primary Species

	Map Code
1. Softwoods (S)	
White spruce	wS
Black spruce	bS
Jack pine	jP
Tamarack	tL
2. Mixed Softwoods	
Black spruce - jack pine	bSjP
or Jack pine - black spruce	jPbS
3. Mixedwoods (SH)	
White spruce or black spruce with aspen	wS or bS, tA
Jack pine with aspen	jP, tA
4. Mixedwoods (HS)	
Aspen, with white spruce or black spruce	tA, wS or bS

Table 1. (continued)

4. Mixedwoods (HS) (cont'd)

Aspen, with jack pine	tA, jP
Black poplar, with white spruce or black spruce	bP, wS or bS

5. Hardwoods (H)

Aspen (white poplar)	tA
Black poplar	bP
White birch	wB

Stand Descriptions

Species Association in the Stand

S Softwood	75%	softwood by volume
H Hardwood	25%	softwood by volume
SH Softwood Dominant Mixed	50-75%	softwood by volume
HS Hardwood Dominant Mixed	25-50%	softwood by volume

B. Non-Forested Productive Land

Non-forested productive land includes land that is available for or capable of producing merchantable stands of timber in the future. This land is divided into four categories: cutover, burnt over, open land and scrub.

Cutover:

The majority of the forest cover has been removed by harvesting, leaving a residual stand that is less than 2.5 m in height, or less than 10% crown closure. Residual stands greater than 2.5 m in height and greater than 10% crown closure are classified as the appropriate forest cover type.

Burned Over:

The majority of the forest cover has been destroyed by fire, leaving a residual stand (or new regeneration) that is less than 2.5 m in height or less than 10% crown closure. This classification does

not include non-productive land. Residual stands greater than 2.5 m in height and greater than 10% crown closure are classified as the appropriate forest cover type.

Open Land:

The open land classification includes: land that has been cleared or cultivated; forest cover with less than 10% crown closure; and natural regeneration including all natural stands less than 2.5 m in height, for all species and all degrees of stocking.

Scrub:

The present vegetation cover consists of shrubs such as willow or alder *(Alnus* spp.*)*; however, the land is considered available for and capable of producing a merchantable forest within a reasonable length of time.

Cutover areas and dates from 1966 to 1983 were obtained from P.A.P.C.O. records and from cutting permits issued by D.P.R.R. (Josza pers. comm.). The 1967 Triple-Steep Hill fire was used as a division point for area totals. The fire is the major recent event in F.L.C. forestry history and very few cutovers were dated prior to 1967. If the dates for a particular cutover spanned the 1967 fire, the area cut was divided in half, with half the cutover area added to the pre-burn totals and half to the post-burn totals. Old cutovers and partial cutovers may now be listed as forest; wherever possible the history was noted. Recent cutovers were subtracted from cover types to determine the present inventory of the forest.

In calculating the amount of area burnt, only Class D and E fires (greater than 40 ha) were recorded from 1967 to the present. The areas of recent fires have been subtracted from that of the cover types which were burned.

C. Non-Productive Land

Non-productive land is land not available for or not capable of producing merchantable timber. The seven divisions of non-productive land

include: clear muskeg, treed muskeg, brushland, meadow, clearing, flooded, and lake or stream.

Clear Muskeg:

Tree cover amounts to less than 10% crown closure. The soil usually is organic, with an accumulation of peat usually greater than 60 cm, derived from sedges, grasses, mosses, and/or woody material. The tree cover vegetation usually consists of black spruce, tamarack and white birch. Other vegetation (hydrophytic) includes sphagnum *(Sphagnum* spp.*)*, Labrador tea *(Ledum groenlandicum)*, feather mosses *(Pleurozium schreberi)*, sedges, rushes *(Juncus* spp.*)*, and cattails *(Typha* spp.*)*.

Treed Muskeg:

With the exception that tree cover exceeds 10% crown closure, treed muskeg is the same as clear muskeg. Tree species are usually black spruce, tamarack and/or white birch.

Meadow:

The vegetative cover usually consists of sedges, reed grasses *(Calamagrostis* spp.*)*, rushes, and other hydrophytic vegetation. Cattails may be found along the fringes of open water. The larger shrubs amount to less than 50% of the vegetative cover. The area may be flooded intermittently and usually contains an accumulation of peat *(Sphagnum* spp.*)*. Mineral soil may be found within 60 cm of the surface. As these areas become drier, they are frequently invaded by willows, tamarack, and black spruce. There is usually a lack of shrubby or woody plants.

Brushland:

The brushland is similar to meadow, except that the larger shrubs (including willow and alder) amount to greater than 50% of the vegetative cover.

Clearing:

Tree cover amount to less than 10% crown closure. These areas

are usually the result of man's activities and include roads (including cleared right-of-way), powerlines, gravel pits, etc.

Flooded:

The flooded classification includes the land area which has been inundated relatively recently. Usual causes are beaver dams and new roads with insufficient allowance for natural drainage. Before flooding, the land may have been non-productive or productive. In the latter case there may be residual stand of dead or dying trees.

D. Forest Harvest

Potential future forestry use of F.L.C. was derived by calculating areas of merchantable stands. A merchantable stand is one which yields 15 cords/ha (2.5/ac). The stands required for each product are:

Merchantable Product	Stands Used
posts	S 10, 15 D jP
pulp	S 15, 20 A-D jP, bS
ties	S 20 B jP
logs	S 20 B jP, wS
rails	S 10, 15 C, D bS
saw timber	HS 20 B, C tA jP wS
(dimension lumber)	SH 20 B, C jP tA wS
	S 20 b jP
SPC poles	S 20 B jP

4.2.1.2 Employment by the Forest Industry

Information on the number of seasonal employees working in the forest industry in F.L.C. as well as preliminary results on allocation of timber harvests permits was obtained from Forestry Branch, D.P.R.R. (Neggers 1984).

4.2.1.3 Management

Areas of silviculture and planting dates were obtained from 1961 township maps (based on 1960 aerial photos), the latest U.T.M. forest

inventory maps, and from the draft report updating the Forest Operating Plan for F.L.C. (Neggers 1984).

4.2.1.4 Access Trails Map

All trails and cutovers were transferred to a 1:50,000 scale U.T.M. map of F.L.C. from the presently used 1:15,840 scale and previously used 1:12,500 scale Forest Inventory Maps. Trails were field checked and rated according to capabilities for year round use.

The four classes used for rating access roads are as follows:

Class 1.

Class 1 roads include main access roads through F.L.C. that are useable at all times except after extreme weather conditions. The class includes some of the grid roads that extend into F.L.C. and an improved access road into a Saskatchewan Forest Products cut block, and that portion of Provincial Highway 6 which passes through F.L.C.

Class 2.

These are all weather sand roads that have very little regrowth. The roads are not as good as the Class 1 roads and may be impassible to conventional vehicles after a large amount of precipitation.

Class 3.

Class 3 roads are narrow trails heavily grown over but still driveable. These roads are not useable after precipitation or in the spring, unless they are in a well-drained area.

Class 4.

Class 4 access includes seismic lines, survey lines, old fire-guards, winter roads, and overgrown trails. Some of these trails can be driven with a 4 wheel drive vehicle but many can only be walked or driven with a snowmobile when the ground is frozen.

The amount of road allowance and line-of-sight visibility decreases from Class 1 to Class 4 roads.

4.2.1.5 Merchantable Stands Map

The Merchantable Stands map was produced by shading in stand types on forest inventory maps, the shading depending on what merchantable product the stand could be used for. The categories used are the same as those listed under Forest Harvest (Section 4.2.1.1 D).

4.2.2. Public Resource Use

Determination of resource use by Indians involved contact with the James Smith and Muskoday (John Smith) bands. It began with a letter of introduction at the beginning of the project (Appendices 6 and 7), followed by meetings with the band councils shortly after. During these meetings, a brief outline of the project was given to the chiefs and councils at both reserves. Elected representatives from the reserves were encouraged to contribute information on the significance of the F.L.C. area to their respective reserves. The elected band members were asked for their opinions on the impact that the dam and reservoir development would have on ungulates, other wildlife and vegetation. They were also asked to indicate what they expected of the land base of F.L.C. with regard to trapping, hunting, forestry and other industries, such as guiding.

A questionnaire was used to determine how much the bands used the renewable resources of F.L.C. during the year. One hundred and ninety questionnaires were left at the James Smith Reserve and one hundred were left at the Muskoday Reserve.

The trappers and their helpers at the James Smith Reserve were requested to answer additional questions. They were also given forest inventory maps of each of their respective trapping blocks. These maps were to be used to delineate important wildlife and vegetative features that they encountered while in F.L.C. The information to be recorded included the location and total number of beaver and beaver houses, wolves, moose, elk, deer, and the locations of their respective traplines.

With regard to the non-Indian public, various organizations (ie. the local Natural History Societies, local chapters of the Saskatchewan

Wildlife Federation, Urban and Rural Municipalities) were contacted by letter in 1982 and 1983 and sent a project description (Appendix 7). Members of these organizations were invited to contact the study team if they had any comments or concerns about the study. No response was received from any of these groups.

The study was advertised in four local newspapers. The advertisement also alerted local residents that elk would be marked in the Fort a la Corne area, and that any sitings of them should be reported to the study team or the Wildlife Branch (D.P.R.R.).

4.2.3 Agricultural Use

Information on grazing and hay leases in F.L.C. was obtained from the files of the Nipawin, Melfort and Prince Albert D.P.R.R. District Offices. These sources also provided information on locations of wild rice leases.

4.3 Wildlife

4.3.1 Wildlife Inventory

Population estimates of the major wildlife species including ungulates and game birds were conducted.

Surveys were used to determine the population status of selected wildlife. Wildlife surveys conducted included: winter elk, moose and deer; spring ruffed grouse *(Bonasa umbellus)* drumming counts; spring, summer and fall waterfowl brood and staging counts; and a reconnaissance survey of nesting activity by birds on and adjacent to the major water bodies in F.L.C.

A stratified random block survey was designed (Stewart pers. comm.) and used in the F.L.C. to obtain population estimates of elk and moose. The stratified random block sampling technique (Siniff and Skoog 1964) has been tried in a number of different areas with good success (Bergerud and Manuel 1969; Evans et al 1966; Gasaway 1977; Hildebrand and Jacobsen 1974; Jacobsen et al 1975; and Jacobsen and Weatherill 1975).

Of the four species of ungulates present locally, elk were selected as the key indicator species for the survey.

Elk densities obtained from previous surveys in F.L.C. were used to stratify the area into four density classes. The area was classified and delineated on maps and aerial photographs into high, medium, low and very low density units. Survey blocks flown for each stratum were 1.6 km by 3.2 km in size (5.2 km^2). The number of blocks to be flown (survey intensity) was determined using the formulae of Siniff and Skoog (1964). The 75 randomly selected sample blocks (Figure 10) were flown between February 12 and 22, 1983, using a Cessna 185 aircraft and flying at an altitude of approximately 90 meters. By seating both observers on one side and making passes approximately 400 m apart at a speed of about 125 km/h, nearly 100% ground coverage was achieved (Jacobsen and Weatherill 1975).

Elk and moose population estimates were calculated according to Cochrane (1963). White-tailed deer could not be accurately counted by the stratified random block technique and, therefore, no population estimate was obtained.

A specific survey to determine the age and sex of elk and moose was conducted during early December 1983. Random flights over the entire F.L.C. area were made at about 90 m above ground at speeds of 130 km/h until 200 elk and 100 moose were counted and their age and sex determined. The age and sex information was supplemented with information obtained during the regular marked elk monitoring flights.

During the period of May 12 to 20, 1983, and in early May, 1984, an intensive spring elk calving survey was flown to locate calving and spring use habitat areas. The fringe and adjacent agricultural areas surrounding F.L.C. were included in the survey. These preferred areas were described and mapped. All cow and cow-yearling groups were counted and their location noted. All major drainages and coulees were searched on several consecutive days.

Areas of preference by moose and white-tailed deer were determined using a combination of field observation, and aerial observations (Appendix 8).

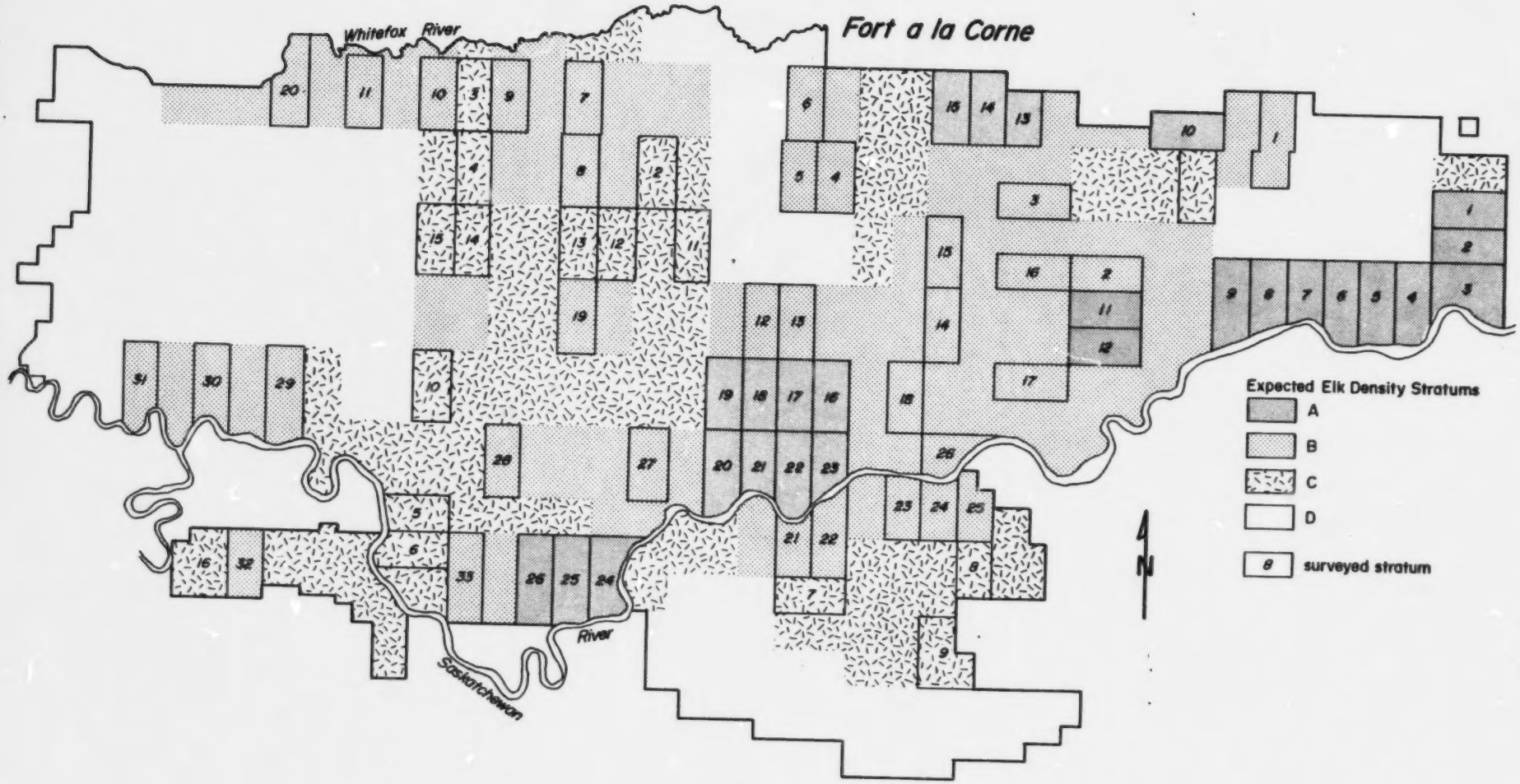


Figure 10. F.L.C. Map Showing Stratified Random Sampling Blocks Flown for Elk Survey, February 1983.

In late fall, 1983, an aerial beaver survey was flown to ascertain areas of high and low beaver populations and to get an estimate of the beaver *(Castor canadensis)* densities within the F.L.C. Surveys were flown at a speed of approximately 130 km/h and at 90 m above ground. The survey consisted of counting both active and inactive beaver lodges.

A July, 1983 waterfowl brood survey was conducted along the Saskatchewan River. During the survey all waterfowl were identified, broods noted and total numbers of each species recorded. Waterfowl species and numbers were also recorded during other field activities.

A fall waterfowl staging survey was done on September 30, 1983. Areas surveyed included the North Saskatchewan River, the Saskatchewan River, the White Fox River and 4.1 km^2 of permanent waterbodies (eg. Campbell Lake) within F.L.C. As with other surveys, a Cessna 185 aircraft was flown at 130 km/h and at an average altitude of 90 m.

Ruffed grouse population trend information was gathered using the technique employed by D.P.R.R. This technique consisted of selecting transects, then driving and periodically stopping for four minutes and recording the number of drummings during each stop. Poor weather and road conditions permitted only a limited survey during the study.

Rare and less prominent bird species (ie. bald eagles) *(Haliaeetus leucocephalus)* were also observed and recorded within the area. A special effort was made to find great blue heron *(Ardea herodias)* and sandhill crane *(Grus canadensis)* nesting sites. These sightings were all mapped on the critical area maps.

4.3.2 Wildlife Harvest

Past harvest and license information was obtained from D.P.R.R. files and reports. Harvest data during the 1982 and 1983 special elk and moose hunting seasons were obtained by doing field checks and follow-up telephone harvest surveys. Results from a mailout hunter questionnaire prepared by D.P.R.R. and sent out to randomly selected hunters were also used for part of the data base. A questionnaire was used to obtain an estimate of hunting success achieved by James Smith and Muskoday Bands

Bear hunters were interviewed in the field to ascertain the annual take and distribution of black bears within F.L.C. Bear hunters using baits are now required to fill out a miscellaneous use permit at the D.P.R.R. District Office. Using the information contained on the permits, a telephone survey of the 59 individuals who hunted in F.L.C. in 1983 was conducted.

The major source of information on furbearers was the D.P.R.R. fur trapping records. An attempt to obtain trapping success from the Indian trappers proved unsuccessful because, as with hunting, the trappers appeared to be reluctant to reveal their take and kept few records of their successes.

4.3.3 Elk Trapping, Marking and Monitoring

An elk trapping, marking, and monitoring program was designed and initiated in the fall of 1982 to assist in identifying the impacts of the development of the S.P.C. dam and reservoir on the elk population, and also to determine if depredation problems in the area are related to these developments. Elk winter feeding had been set up on the east side of F.L.C. in 1981 by D.P.R.R. in response to crop damage complaints by farmers, and the Boughen Nursery owners at Nipawin.

The elk trapping technique was designed after that used by Hudson (pers. comm.) of the University of Alberta, and Lukiwski (pers. comm.) of Parks Canada at Elk Island National Park.

Each trap, primarily constructed from local materials (Photo 1), has an oval shaped catch or holding pen that is 10 to 15 m long and 9 to 12 m wide at its widest point (Figure 11). Two gates of different size, design and purpose were located at opposite ends of the trap. The walls were made of vertically lined wooden slabs 3 m high, nailed to horizontally placed rails. The rails were spiked to trees or strategically located posts. The larger gate was designed to swing freely and to close from the inside against a strong self-restraining latch. At the opposite end of the trap a small wooden door with a vertically sliding plywood gate led into the working chute.

Photo 1. Trap Constructed for Elk Monitoring Study.

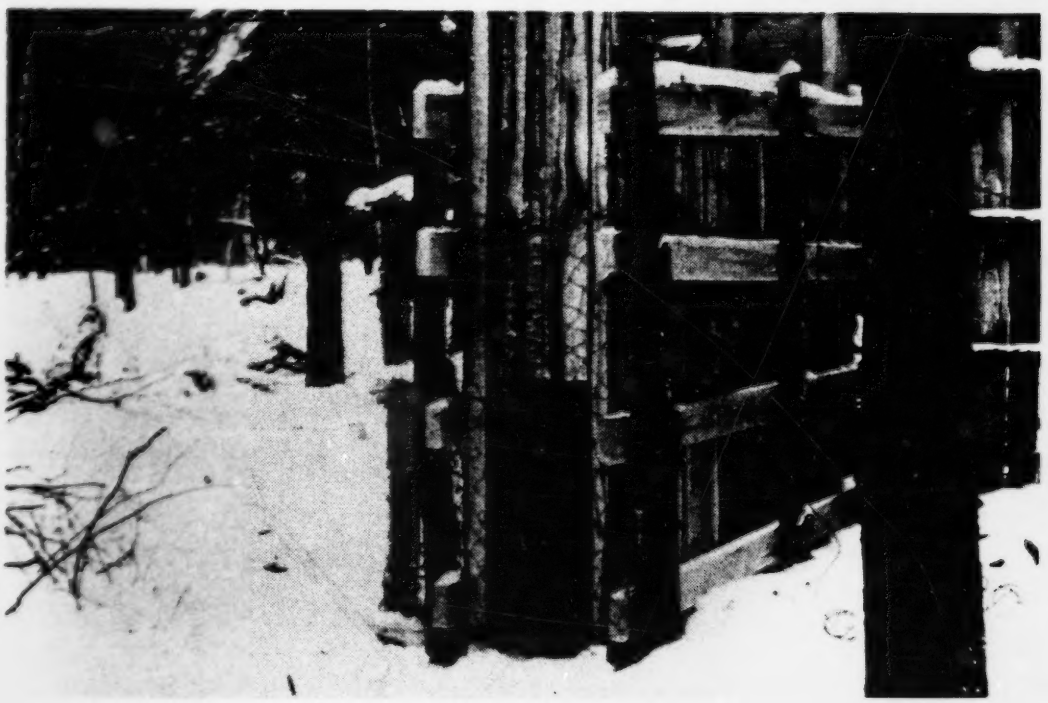


Photo 2. Chute Used for Handling Captured Elk.

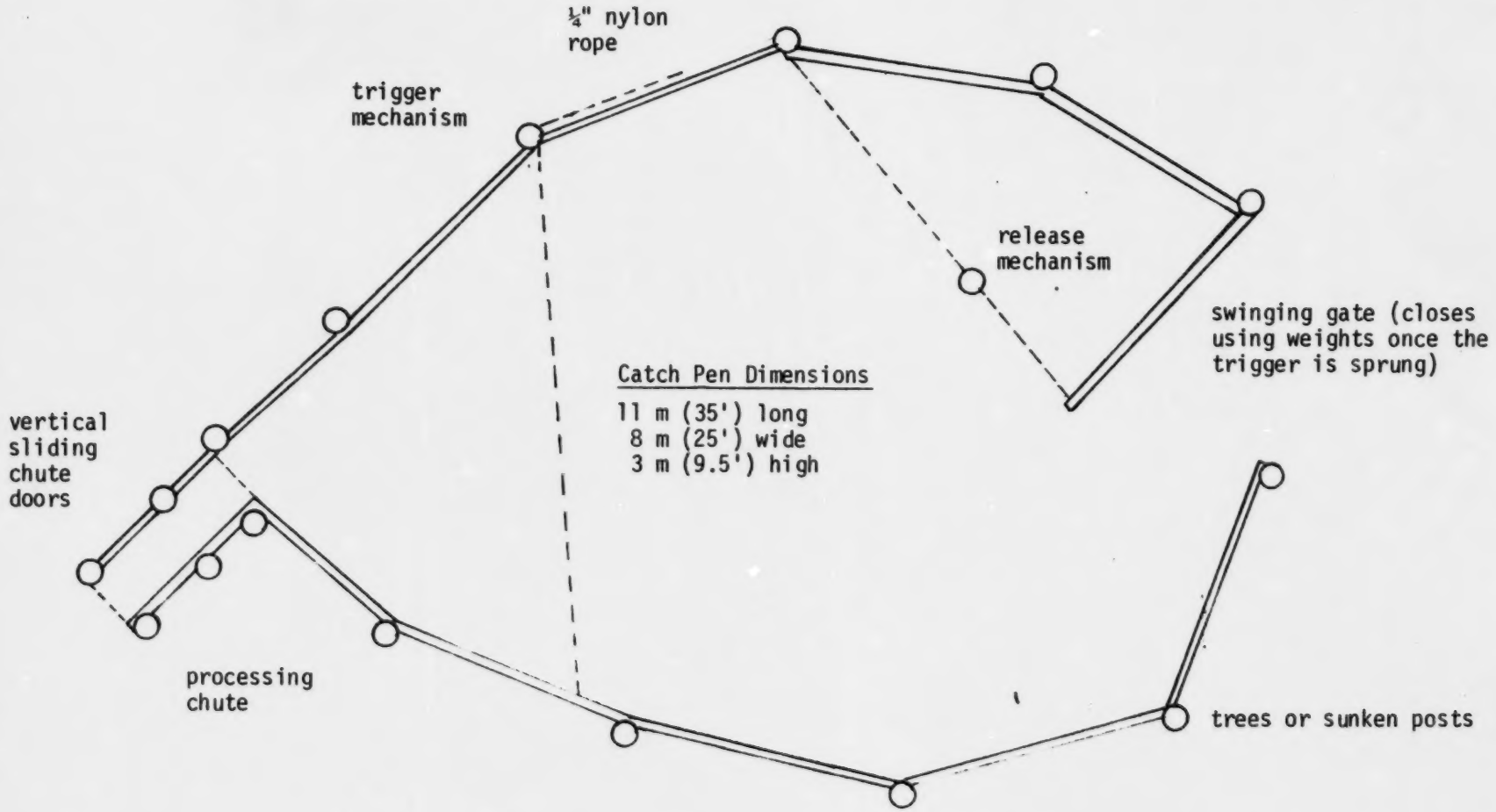


Figure 11. Overhead View of Elk Traps Used in F.L.C.

The chute was narrow and roofed, with dividers, and opened to the outside with another sliding gate. Working windows opened into the forward area of the chute to allow for handling of the individual animals (Photo 2). The large pen funnelled into the processing area, but the chute itself was not designed to handle large male elk. Consequently, antlered males had to be handled in the holding pen, using immobilizing drugs, ropes, and halters.

Telemetric methods used were adapted from Lynch (pers. comm.) and Stewart (pers. comm.). Veterinary assistance during field operations and drug handling advice were provided by Dr. G. Glover and Dr. D. Allen of the Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, and Prince Albert respectively. The immobilizing agents, their dosages, and antidote requirements were adopted from Hebert and McFetridge (1979).

The cartridge-fired Palmer cap-chur rifle was usually used for immobilization. The immobilizing agent used was either M99, etorphine hydrochloride, or fentanyl. These immobilizing agents were usually augmented with slight dosages of Rompun (xylazine), a normal tranquilizer. The antagonist for M99 is M50-50 (diprenorphine), and that for Fentanyl is naloxone.

Whenever possible, the restraining chute was used for processing elk without tranquilizers or immobilizing agents. Only males or highly excited animals were immobilized. The darting distances ranged from 4 to 12 m. The dosages for the drugs used depended on the estimated body weights and the excitement level of each animal.

The main trap gate trip mechanism, involving a series of catches, ropes, trip wires, and pulleys, was designed so that a large animal such as a deer or elk walking into the rear of the catch pen would trip the mechanism, closing the heavy gate quickly. Counter weights, hung from the gate, ensured that the closing operation was swifter than a retreating large animal. The small gates were manually operated with ropes from a distance.

The trigger mechanism was modified to enable capturing more than

one animal at a time and to prevent the wind from closing the gate. The final design of the trigger mechanism is shown in Figure 12.

Initially, six trap sites were selected within the confines of F.L.C. These sites were picked on the basis of known elk wintering areas as determined by previous surveys, elk trails, suitable terrain and access, diversity of habitat types, proximity to known crop depredation sites, availability of building material and potential human disturbance. In the second season two of the six trap sites were abandoned and two new sites found and traps constructed. A portable trap was also set up but never used.

Each trap was individually designed, reflecting local terrain and cover availability. Trap sizes also varied greatly. If primarily males were expected at the site, the pen was designed to hold only one or two individuals so that possibility of injury could be reduced.

Elk were baited into the trap sites by using well-cured, high quality alfalfa. Usually the trapping operation began by laying out several long (up to 1.6 km) baitlines of feed along trails or roads on the snow. Baiting was continued for several days. At the same time, the holding pens were baited and gates were left open to allow animals to wander in and out and familiarize themselves with the traps. Once elk were entering the trap and using the bait, the trip mechanism was set. The baited traps required daily service, regardless of elk activity, to ensure they had not been sprung and to see if more alfalfa was needed. Occasionally, trapping at one of the sites had to be interrupted for several days when deer started to frequent the sites.

Elk trapping appeared to work best following a snowstorm or at the onset of cold clear weather.

If one or more elk were observed in the sprung traps, a veterinarian and other help was obtained. After immobilization or restraint, elk were checked for injuries, deformities, and ticks. A fecal sample was collected for later examination to determine if liver flukes *(Fasciola magna)* were present. Antlers were measured and then removed. All females one and a half years of age or older were pregnancy checked. An outside

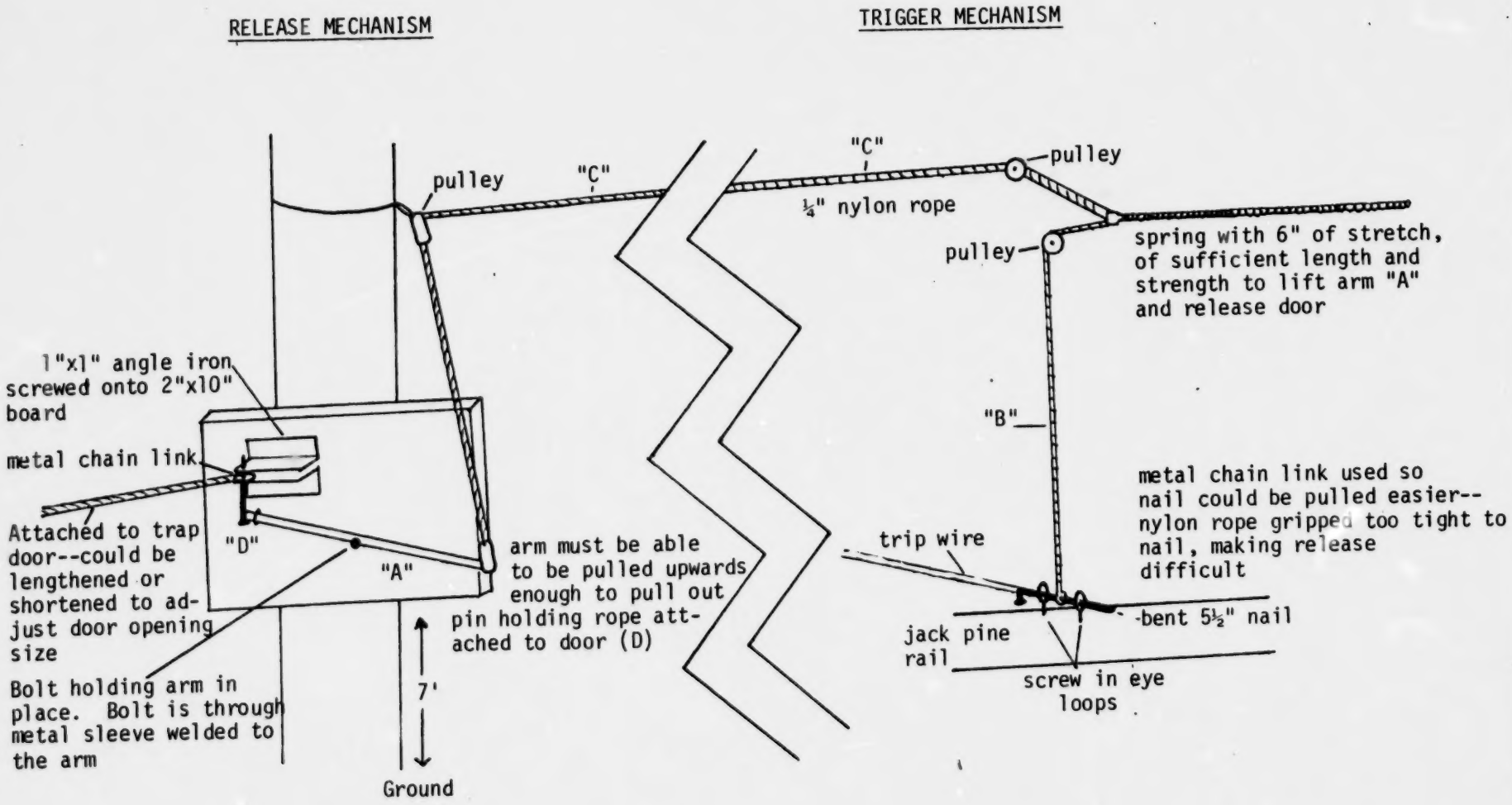

RELEASE MECHANISM
TRIGGER MECHANISM
pulley
"C"
"C"
pulley
¼" nylon rope
pulley
spring with 6" of stretch, of sufficient length and strength to lift arm "A" and release door
1"x1" angle iron screwed onto 2"x10" board
"B"
metal chain link
metal chain link used so nail could be pulled easier--nylon rope gripped too tight to nail, making release difficult
Attached to trap door--could be lengthened or shortened to adjust door opening size
"D"
"A"
arm must be able to be pulled upwards enough to pull out pin holding rope attached to door (D)
trip wire
bent 5½" nail
jack pine rail
screw in eye loops
Bolt holding arm in place. Bolt is through metal sleeve welded to the arm
7'
Ground

Figure 12. Trigger Mechanism Used on Elk Traps in F.L.C.

incisor was extracted from all adults for age determination. An ear tag and radio or color coded neck band was attached for future field identification.

A dose of long-acting penicillin was administered to all captured elk to reduce the possibility of future infection. Immobilized animals were given the antidote. The release was accomplished by removing all impediments from the animal and opening the doors of the trap.

Monitoring of radio-collared elk started immediately after the animals were released from the trap and continued at two week intervals. The equipment used for monitoring was a Falcon V receiver and Yagi antennae.

If radio collared elk could not be located from the ground, they were located by flying the entire F.L.C. with the antennae and receiver tuned, using previously plotted locations for each animal as starting points. The information was recorded on air photo mosaics and plotted on maps using Universal Transverse Mercator (U.T.M.) co-ordinates.

Once all animals were located from the air, exact location was pinpointed using triangulation from the ground. Ground location was verified by walking onto the animal and following its movements. Exact ground location was undertaken only when transmitter signal of an animal had not moved since last location, to determine if transmitter had become dislodged, or if the animal had died.

Elk with individually marked neck collars were also observed and their locations recorded. These were generally incidental observations, and were often reported by a hunter or someone from the general public.

5.0 RESULTS & DISCUSSION

5.1 Biophysical Mapping

The biophysical mapping of F.L.C. has resulted in a series of four maps: Base, Vegetation, and two Critical Wildlife Habitat Maps.

The Base Map delineates ecosites on the basis of soil association,

soil texture, landform and slope. The areas comprised by these land types are presented in Table 2.

The Vegetation Map delineates the existing overstory species and the locations of forestry activity. The areas of each vegetation type and of silviculture and cutover activities are shown in Tables 3 and 4.

The Critical Wildlife Habitat Maps identify areas that support higher populations of animals and birds on a seasonal or year-round basis. The loss of one of the critical habitat areas would result in the loss of the local wildlife population. The loss would have regional implications and, depending on the species, may also have provincial implications.

One Critical Wildlife Habitat Map illustrates critical habitat for elk, while the second shows the critical habitat for moose, white-tailed deer, beaver, great blue herons, sandhill cranes, and waterfowl. Areas of critical habitat per species according to land type are given in Tables 5 and 6, while Table 7 shows the areas of critical wildlife habitat by species and land type on cutovers and silvicultural areas.

In addition to these critical areas, the remaining area of F.L.C. also supports wildlife, although with less species diversity and at lower population levels. When F.L.C. is looked at in a provincial context, the entire area is critical wildlife habitat.

5.1.1 Critical Wildlife Habitat on Biophysical Land Types

Aeolian (A) Lands

Aeolian lands (Pine Association) make up 56.8% (742.8 km^2) of F.L.C. (Table 2). These dominantly Brunisolic and Regosolic soils have developed from coarse textured sandy glacio-fluvial and glacio-lacustrine deposits that have been subsequently reworked by wind. Because of the nature of the parent material, the soils are acidic to strongly acidic, of low fertility and have low moisture holding capacity. They are virtually stone-free and occur on topography ranging from gently undulating to strongly rolling. Areas of stabilized sand dunes occur in the southeastern corner of F.L.C., south of the Saskatchewan River.

Table 2. Area of land types on the Base Map for Fort a la Corne Provincial Forest and Wildlife Management Unit*.

Land Type	Area (km^2)	% of Map Area
Aeolian (A)	742.1	56.8
Lacustrine (L)	249.0	19.0
Alluvium (Av)	114.2	8.8
Fen (OF)	108.9	8.3
Drainage (D)**	36.9	2.8
Bog (OB)	33.9	2.6
Fluvial-Lacustrine (FL)	16.8	1.3
Major Permanent Water Bodies**	4.1	0.3
Eroded (Er)	1.8	0.1
Total	1307.7	100.0
Saskatchewan River (D-mc)	8.3	
	1316.0	

* Areas of land complexes were calculated according to the dominant component in each complex.

** Excludes the Saskatchewan River.

Table 3. Area of vegetation types in the Fort a la Corne Provincial Forest and Wildlife Management Unit.

Vegetation Types	Km^2	% of Type	% of F.L.C. Area
Aspen (tA) dominant			
tA	172.5	37.27	13.20
tA(B)	4.7	1.02	0.36
tA-jP	66.6	14.39	5.09
(tA-jP)(B)	50.2	10.85	3.84
tA-bP	34.9	7.54	2.67
tA-Ws	34.2	7.39	2.62
(tA-WS)-bS	45.5	9.83	3.48
(tA-WS)-bP	5.2	1.12	0.40
(tA-WS)-jP	3.1	0.67	0.24
tA-WB	3.7	0.80	0.28
(tA-WB)-jP	4.4	0.95	0.34
tA-Sa	16.5	3.57	1.26
tA-bS	3.7	0.80	0.28
tA-M	5.0	1.08	0.38
tA-(WS+WB)	12.6	2.72	0.96
	462.8	100.00	35.40
Jackpine (jP) dominant			
jP	192.9	40.18	14.76
jP(B)	51.6	11.55	3.95
jP-tA	122.7	30.47	9.39
jP-M	5.4	1.21	0.41
jP-S	74.1	16.59	5.67
	446.7	100.00	34.18
Mixedwood			
tA+jP	25.0	86.81	1.9
(tA+jP)-M	3.8	13.19	0.3
	28.8	100.00	2.2
White Birch (WB) dominant			
WB	0.3	5.66	0.02
WB-tA	5.0	94.34	0.38
	5.3	100.00	0.40
Tamarack (tL) dominant			
tL	0.5	1.10	0.04
tL-sB	0.8	1.77	0.06
(tL+Sa)-bS	44.0	97.13	3.36
	45.3	100.00	3.46

Table 3 (cont'd)

Vegetation Types	Km^2	% of Type	% of F.L.C. Area
Black Spruce (bS) dominant			
bS	3.80	16.18	0.29
bS-tL	15.60	66.38	1.19
(bS-tL)-Sa	3.30	14.04	0.25
bS-WS	0.20	0.85	0.01
bS-Sa	0.40	1.70	0.03
(bS-Sa)-WS	0.20	0.85	0.01
	23.50	100.00	1.78
Black Spruce (bS) and Tamarack (tL)			
bS+tL	18.30	53.98	1.40
(bS+tL)-Sa	15.60	46.02	1.19
	33.90	100.00	2.59
Willow (Sa) dominant			
Sa	24.70	16.72	1.89
Sa-tL	0.90	0.61	0.07
(Sa-tL)-bS	116.50	78.88	8.90
Sa-tA	5.60	3.79	0.43
	147.70	100.00	11.29
Sa+tL	0.70	2.51	0.05
(Sa+tL)-bS	27.20	97.49	2.08
	27.90	100.00	2.13
Others			
Open Carex (Ca) meadows	2.60	100.00	0.20
Cutovers	47.70	100.00	3.65
Silviculture (cutovers with silvicultural treatments)	17.20	100.00	1.32
Cultivation	0.80	100.00	0.06
Water Bodies*	17.50	100.00	1.34
TOTAL	1,307.70		100.00%

* 4.1 km^2 of this is in the form of permanent water bodies.

Table 4. Area (km^2) of cutovers and silvicultural areas by land type in Fort a la Corne Provincial and Wildlife Management Unit.

	Aeolian	Alluvium	Lacustrine	Fluvial-Lacustrine	Fens	Bogs	Drainages	Eroded	Total
CUTOVERS									
Area of cutovers per land type (km^2)	44.60	0.63	1.99	-	-	0.46	0.02	-	47.70
% of total area of cutovers	93.51	1.32	4.17	-	-	0.96	0.04	-	100.00
SILVICULTURAL AREAS									
Areas of silviculture per land type (km^2)	16.52	0.36	0.32	-	-	-	-	-	17.20
% of total silvicultural area	96.05	2.09	1.86	-	-	-	-	-	100.00

Table 5. Approximate Areas of Seasonal Critical Elk Habitat According to Land Types in the Fort a la Corne Provincial Forest and Wildlife Management Unit.

		Aeolian (A)	Alluvium (Av)	Lacustrine (L)	FEN (OF)	Drainage (D)	Eroded (Er)	Bog (OB)	Fluvial-Lacustrine (FL)	Major Water Bodies	TOTAL F.L.C. Area
#1 spring	- area (Km^2)	32.79	14.72	42.04	20.82	5.95	0.50	8.48	3.84	2.80	131.94
	- % of critical habitat	24.85	11.16	31.86	15.78	4.51	0.38	6.43	2.91	2.12	100.00
	- % of land type	4.42	12.89	16.88	19.12	16.12	27.78	25.01	22.86	68.29	10.09
#2 spring	- area	62.59	12.39	24.96	9.61	12.27	1.30	0.54	2.78	1.30	127.74
	- % of critical habitat	49.01	9.70	19.54	7.52	9.61	1.02	0.42	2.18	1.02	100.00
	- % of land type	8.43	10.85	10.02	8.82	33.25	72.22	1.59	16.55	31.71	9.77
TOTAL SPRING	- total area	95.38	27.11	67.00	30.43	18.22	1.80	9.02	6.62	4.10	259.68
	- % of total critical habitat	36.73	10.44	25.80	11.72	7.02	0.69	3.47	2.55	1.58	100.00
	- % of land type	12.85	23.74	26.90	27.94	49.37	100.00	26.60	39.41	100.00	19.86
#1 winter	- area (Km^2)	114.68	13.04	77.75	35.99	14.73	1.80	1.53	2.00	-	261.52
	- % of critical habitat	43.85	4.99	29.73	13.76	5.63	0.69	0.59	0.76	-	100.00
	- % of land type	15.45	11.42	31.22	33.05	39.92	100.00	4.51	11.90		20.00
#2 winter	- area	55.95	6.00	44.65	17.46	7.07	-	3.80	2.84	-	137.77
	- % of critical habitat	40.61	4.36	32.41	12.67	5.13	-	2.76	2.06	-	100.00
	- % of land type	7.54	5.25	17.93	16.03	19.16	-	11.21	16.90	-	10.53
TOTAL WINTER	- total area	170.63	19.04	122.40	53.45	21.80	1.80	5.33	4.84		399.29
	- % of total critical habitat	42.73	4.77	30.65	13.39	5.46	0.45	1.33	1.21		100.00
	- % of land type	22.94	16.67	49.15	49.08	59.08	100.00	15.72	38.80		30.53
TOTAL CRITICAL HABITAT*	- total area (Km^2)	217.00	32.36	150.86	60.98	23.35	1.80	13.34	6.72	3.54	509.95
	- % of total critical habitat	42.55	6.35	29.58	11.96	4.58	0.35	2.62	1.32	0.69	100.00
	- % of land type	29.24	28.34	60.59	56.00	63.28	100.00	39.35	40.00	86.34	39.00

* Total area of critical habitat for elk is less than the sum of spring and winter habitats. The sum of the two habitats includes areas of overlap that are critical in both spring and winter. The total critical habitat figure does not include this overlap.

Note that percentages of land type will not add to total, because land type percentages were done on the basis of individual land types.

Table 6. Approximate areas of critical wildlife habitat according to land types in the Fort a la Corne Provincial Forest and Wildlife Management Unit

SPECIES		LAND TYPE: Aeolian (A)	Alluvium (Av)	Lacustrine (L)	Fen (OF)	Drainage (D)	Eroded (Er)	Bog (OB)	Fluvial Lacustrine (FL)	Major Water Bodies	TOTAL
WHITE-TAILED DEER	- area (Km^2)	117.22	15.16	68.84	29.24	3.93	-	0.49	1.31	4.10	240.29
	- % of critical habitat	48.78	6.30	28.65	12.17	1.64	-	0.20	0.55	1.71	100.00
	- % of land type	15.80	13.27	27.65	26.85	10.65	-	1.45	7.80	100.00	18.38
MOOSE	- area	93.49	56.25	11.41	31.85	9.08	1.80	7.49	-	3.90	215.36
	- % of critical habitat	43.40	26.12	5.30	14.83	4.22	0.84	3.48	-	1.81	100.00
	- % of land type	12.60	49.26	4.58	29.33	24.61	100.00	22.09	-	95.12	16.47
BEAVER	- area	6.50	6.40	6.97	17.71	22.08*	1.66	1.59	0.18	3.10(5.50)**	66.19
	- % of critical habitat	9.82	9.67	10.53	26.76	33.36	2.51	2.40	0.27	4.68	100.00
	- % of land type	0.08	5.60	2.80	16.26	59.84	92.22	4.69	1.07	75.61	5.06
Waterfowl	- area	-	0.29	-	-	0.98	-	-	-	2.45(2.63)***	3.72
	- % of critical habitat	-	7.80	-	-	26.34	-	-	-	65.86	100.01
	- % of land type	-	****	-	-	7.21	-	-	-	59.76	0.28
Sandhill Cranes	- area	1.63	1.19	1.76	16.23	1.44	-	-	-	2.66(0.19)	24.91
	- % of critical habitat	6.54	4.78	7.07	65.16	5.78	-	-	-	10.67	100.00
	- % of land type	0.22	1.04	0.71	14.90	3.90	-	-	-	64.87	1.91

*-this total area of drainage spans a linear distance of 186.81 Km (this length includes some of the Lacustrine and Aeolian lowlands that extend off the ends of the drainage along with the White Fox River which forms the north boundary of Fort a la Corne)

( )-indicates water bodies outside of Fort a la Corne's boundaries. This area is not included in F.L.C. total

( )**-the 5.50 Km^2 indicated is River Habitat spanning 11.23 Km in length. It is outside F.L.C. and is not included in the total.

()***-the 2.03 Km^2 includes 1.19 Km^2 of water bodies outside Fort a la Corne's boundaries plus 1.44 Km^2 of River habitat. These are not included in the total

****-less than 0.01%

Table 7. Area (km^2) of critical wildlife habitat (CWH) by species and land type on cutovers and silvicultural areas in Fort a la Corne Provincial Forest and Wildlife Management Unit.

Species	Aeolian	Alluvium	Lacustrine	Fluvial Lacustrine	Fens	Bogs	Drainages	Eroded	Total
Elk									
Area of CWH on Cutovers	5.44	0.11	0.23	-	-	-	-	-	5.78
% of Total CWH on Cutovers	12.19	17.46	11.56	-	-	-	-	-	12.11
Area of CWH on Silvicultural Areas	2.72	-	0.25	-	-	-	-	-	2.97
% of Total CWH on Silvicultural Areas	16.46	-	13.44	-	-	-	-	-	17.21
Moose									
Area of CWH on Cutovers	2.53	0.14	0.09	-	-	0.26	-	-	3.28
% of Total CWH on Cutovers	5.67	22.22	4.52	-	-	56.52	-	-	6.88
Area of CWH on Silvicultural Areas	0.73	0.12	-	-	-	-	-	-	0.85
% of Total CWH on Silvicultural Areas	4.42	33.33	-	-	-	-	-	-	4.94

Table 7 (cont'd)

Species	Aeolian	Alluvium	Lacustrine	Fluvial Lacustrine	Fens	Bogs	Drainages	Eroded	Total
Deer									
Area of CWH Cutovers	5.82	0.06	0.31	-	-	-	-	-	6.19
% of Total CWH on Cutovers	13.05	9.52	15.58	-	-	-	-	-	12.98
Area of CWH on Silvicultural Areas	0.42	-	0.25	-	-	-	-	-	0.67
% of Total CWH on Silvicultural Areas	2.54	-	13.44	-	-	-	-	-	3.90

The most common plant association on the finer textured soils has an overstory that is dominately jack pine. Aspen sometimes comprises up to 50% of the stand volume but more often it accounts for 30% or less. When present, aspen is often located in the depressional areas of knob and kettle landforms while jack pine will be found on the higher, more xeric sites. The dominant understory on soils with finer texture is alder, blueberry *(Vaccinium myrtilloides)*, bearberry *(Arctostaphylos uva-ursi)* and reindeer moss *(Cladonia* spp.*)*.

The coarser textured soils are more rapidly drained and support sparse stands of jack pine with a dominant ground cover of reindeer moss and Canada buffaloberry *(Sheperdia canadensis)*. Peaty Gleysolic soils occur in larger, poorly-drained depressions and generally support black spruce, Labrador tea, and feather moss.

Aeolian lands in many areas of F.L.C. are closely associated with Alluvial soils of the Recent time period. These have been mapped as Aeolian-Alluvial complexes and the vegetation differs depending on the amount of moisture available. Drier areas have a jack pine overstory while the more mesic areas have an overstory of willow or only a thick growth of sedges and sparse distributions of arrow-leaved colt's-foot *(Petasites sagittatus)*, silverweed *(Potentilla anserina)* and field mint *(Mentha arvensis)*.

The transition areas between the mesic and xeric sites support trembling aspen, white spruce, balsam poplar and some white birch. The understory includes species from the two adjacent moisture regimes.

Areas of stabilized sand dunes make up approximately 20 km^2 in the south-east portion of F.L.C. An open mature overstory of jack pine covers the entire area. Some white birch and black poplar occur on north-facing slopes with a light understory of white birch, Saskatoon *(Amelanchier alnifolia)* and choke cherry *(Prunus virginiana)*. South-facing slopes support a sparse growth of Canada buffaloberry. Bearberry and reindeer moss form the ground cover over the entire area along with rose *(Rosa* spp.*)*, blueberry and slender wheat grass *(Agropyron trachycaulum)*. North-facing slopes have a higher density of rose and slender wheat grass as well as bedstraw *(Galium* spp.*)*, bishop's-cap *(Mitella nuda)* and twin-

flower *(Linnaea borealis)*.

Agricultural capabilities for these soils is noted as Class 5-6 by the Canada Land Inventory (C.L.I.) (Acton and Clayton 1968). Soil limitations are due to low moisture holding capacity and low soil fertility.

The forestry capability is Classes 5 and 6 with limitations due to either soil moisture deficiency or soil moisture excess (Kabzems et al. 1976). Despite this low classification the majority of the forestry activity has been concentrated on Aeolian lands. Ninety-five percent of these soils are silvicultural treatment areas in F.L.C.

Half of the 71 167 ha of grazing leases in F.L.C. are on Aeolian lands. Light to moderate grazing pressure generally does not diminish wildlife habitat capabilities. However, under heavy grazing pressure, available browse and shrub cover is significantly reduced due to consumption and trampling by livestock (Rock 1981). While there is not much grazing in F.L.C., it is heavy where it occurs, especially in the southeast portion.

Wildlife Habitat Capability

The wildlife capacity of the Aeolian lands is rated as Class 3 by the C.L.I. (Rock and Scheelhaase 1973). This moderate to low wildlife capability rating has been substantiated by the work of the study team in the past two years.

Forty-three percent of critical habitat for elk is on 29% of the Aeolian soils. Thirty-seven percent of the total spring critical habitat and 43% of the total winter critical habitat are on Aeolian soils. Most of the critical habitat on Aeolian soils is on the Aeolian-Alluvial complex lands. These areas have fewer access roads due to high soil moisture in the depressions. The balance of the critical elk habitat on Aeolian soils are in areas where these lands are bordered by Lacustrine or organic (Bogs and Fens) soils or along the boundaries of F.L.C. adjacent to cultivated fields. There are also ungulate travel-corridors through Aeolian lands that are located between areas of critical habitat.

On lands with low capability for wildlife, the amount of use of the lands by elk is dependent on the number of access roads and therefore the amount of human activity in the area. The greater the access to the area the less the area is used by elk.

Forty-three percent of critical moose habitat, 49% of critical white-tailed deer habitat, and 10% of critical beaver habitat is also on Aeolian lands. Some areas with good habitat for moose have forestry access roads running through them. These areas have very few or no moose in them. There is no critical great blue heron habitat on Aeolian lands but there is critical habitat for waterfowl (8%) and sandhill cranes (7%). The habitat for these birds is where Aeolian lands have a drainage running through them or where the land is adjacent to a Fen, Bog, or an Alluvial area.

Lacustrine (L) Lands

Lacustrine lands (La Corne and Porcupine Plain Associations) are dominantly Gray Luvisols (Gray wooded) developed from moderately coarse to fine textured glacio-lacustrine deposits. The soils are stone-free and surface textures can range from sandy loam, fine sandy loam to loam. They make up 19% (249.0 km^2) of the total area of F.L.C. and form some of the most productive areas for wildlife.

The Lacustrine lands of the Porcupine Plain Association are mostly on the slopes of the Saskatchewan River Valley and on old terraces within the valley itself. They are evident because water erosion has cut down through and removed deltaic sands and exposed Lacustrine sediments. The La Corne Association is also found along the Saskatchewan River Valley but extends onto the uplands and often forms complexes with Aeolian lands.

Lacustrine lands are some of the most productive in the map area. They support balsam poplar or trembling aspen, and white spruce dominates stands in association with balsam fir and white birch where drainage is good. Imperfectly drained soils support white spruce, trembling aspen and balsam poplar while in depressional, poorly drained areas, black

spruce is dominant (Anderson 1976).

Understory vegetation species, height and density vary depending on the density of the overstory. The most common shrubs are high bush-cranberry *(Viburnum opulus)*, saskatoon, choke cherry, red-osier dogwood *(Cornus alba)* and beaked hazelnut *(Corylus cornuta)*. Under the shrub layer there is a wide range of smaller shrubs, forbs and grasses including wild sarsaparilla *(Aralia nudicaulis)*, bedstraw, meadow-rue *(Thalictrum* spp.*)*, low bush-cranberry *(Viburnum edule)*, twining honeysuckle *(Lonicera dioica)*, wintergreen *(Pyrola* spp.*)*, bunchberry *(Cornus canadensis)*, fireweed *(Epilobium angustifolium)* and ground-pine *(Lycopodium obscurum)*. In low-lying areas and areas where Lacustrine interfaces with Alluvium or organic areas, there is an increase in the amount of willow and more moisture tolerant plants. Vegetation found includes grape ferns *(Botrychium simplex)*, ostrich fern *(Matteucia struthiopteris)*, horsetail *(Equisetum* spp.*)*, fringed brome *(Bromus ciliatus)*, three-leaved Solomon's seal *(Smilacina trifolia)* and colt's-foot.

These soils have a C.L.I. agricultural rating extending from Class 3 to 6 when the topography is gently to moderately rolling (slope Class 4-5). The soils are very susceptible to erosion.

The C.L.I. capability for forestry is between Classes 4 to 6. Limitations range from insufficient to too much soil moisture. These areas are some of the most productive forest soils in the Prince Albert map area (Anderson 1976). The most common species on these soils is aspen but the most common commercial forest species is white spruce. The rapid regrowth of aspen, birch and beaked hazelnut is not favourable for forestry purposes as it slows regeneration of spruce, but it provides excellent cover and browse for ungulates. Presently less than 4% of the cutting activity and less than 1% of the silvicultural treatment in F.L.C. has been on these soils.

Wildlife Habitat Capability

The C.L.I. classification for Lacustrine lands gives them only a slight limitation to the production of ungulates (Class 2). Not only

is this the most productive ungulate habitat in F.L.C., it is the largest area of productive land for ungulates in the entire Prince Albert map area.

Thirty percent of the total critical habitat for elk is on 61% of the Lacustrine lands. Thirty-one percent of the critical winter habitat and 26% of the critical spring habitat are in Lacustrine areas.

The majority of Lacustrine soils that provide the basis for critical elk habitat are along the Saskatchewan River. These areas are characterized by a high amount of relief and are often in association with drainages.

Most of the Lacustrine soils have fewer access roads through them than do Aeolian soils. This, combined with a better quality food source, explains the higher concentrations of ungulates in these areas.

The only exception to this is south of the Saskatchewan River and northeast of James Smith and Cumberland Reserves. This area is directly south of the river and is good quality habitat that has very few animals using it. There are four good access roads into this area. Although specific statistics on unregulated harvest are not available, we believe that the harvest and high levels of human activity limit the elk population in this area.

Lacustrine soils form 29% of the critical habitat for white-tailed deer, 5% for moose, 11% for beaver and 7% for sandhill cranes. There is no critical habitat for waterfowl on Lacustrine soils.

The critical deer and moose habitat is in some of the same areas as that for elk. The areas have a combination of good quality browse, very few access roads, and therefore very little human activity.

All of the beaver habitat on Lacustrine soils is adjacent to drainages, alluvial areas, bogs, fens or the Saskatchewan River. The critical beaver habitat extends out onto the Lacustrine soils where the beavers cut down trees for food and for lodge and dam construction.

Fluvial-Lacustrine (FL) Lands

Fluvial-Lacustrine lands (Nisbet Association) make up 1.3% (16.8 km^2) of the F.L.C. area and have Dark Grey Chernozemic soils developed from moderately coarse to coarse textured sandy fluvial-lacustrine sediments. Nisbet soils are restricted to the southeastern portion of the study area near the boreal forest/aspen parkland boundary, and account for 1.3% (16.8 km^2) of F.L.C.

The most common surface textures are loamy sand and sandy loam. The loamy sands are C.L.I. Class 5 for agricultural productivity, with severe limitations due to low moisture holding capacity and low levels of soil fertility. They are very susceptible to wind and water erosion. The loamy sand types are suited to forage production only while the sandy loams are marginally suitable for annual crops (Anderson and Ellis 1976). Canada Land Inventory capability for forestry is Class 5 or 6 with severe limitations to growth of commercial forests due to soil moisture deficiencies. There have been no forestry activities on these soils.

Jack pine and trembling aspen are the major components of the forest overstory on this association. The density of the crown cover varies depending on the age of the stand and influences the amount and diversity of the understory.

The dominant tall understory species are trembling aspen, balsam poplar, white spruce or willow. Saskatoon, silverberry *(Elaeagnus commutata)*, choke cherry, pin cherry *(Prunus pensylvanica)*, shrubby cinquefoil *(Potentilla fruticosa)*, honeysuckle, red-osier dogwood, snowberry *(Symphoricarpos albus)*, rose and willow are also common. Grasses are common in the more open areas. A greater diversity of forbs were found on this land type than on the others in F.L.C.

Approximately 80% of this land type has been leased for grazing livestock. All of this land type is on the east side of F.L.C. on the edge of the forest adjacent to cultivated fields, and easily accessible for moving stock on and off of a lease. Additional areas are being grazed without grazing permits.

Wildlife Habitat Capability

Canada Land Inventory ratings are Classes 3 and 4 which indicates slight to moderate limitations for the production of ungulates. Three percent of the critical spring habitat for elk and 1% of the critical winter habitat are on these soils. Forty percent of this land type accounts for 1% of the area of total critical habitat for elk.

There is evidence of heavy use of the area by ungulates. Shrubs outside the grazing leases have been overbrowsed and many trees and shrubs have had bark removed by deer and elk. Less than 1% of the total critical white-tailed deer habitat is on 8% of the Fluvial-Lacustrine lands and less than 1% of the total critical beaver habitat is on this land type. All of this habitat is associated with Lars Creek. Fluvial-Lacustrine soils have no critical habitat for moose, waterfowl, or sandhill cranes.

Eroded (Er) Lands

Complexes of Eroded soils make up 0.1% (1.8 km^2) of the total F.L.C. The parent materials are variable because of their origin from a variety of materials. Sandy and gravelly textures are most common and the soils are rapidly to well drained. The topography is usually strongly dissected, occurring adjacent to major valleys. This category also includes areas of slumping. The vegetation is similar to other well-drained soils, with mixed stands of trembling aspen, white birch, white spruce, and jack pine. Sparse stands of jack pine are common on south-facing slopes, particularly where soils are coarse textured. Some presently eroding soils have little or no vegetative cover. Because of the variety of microclimates, this land type supports many different shrubs, forbs and grasses.

Agricultural capability is Class 6 because of occurrence on steep slopes and their susceptibility to erosion.

Except for those soils occurring on lower slopes, there are severe to very severe limitations for the growth of commercial forests due to soil moisture deficiencies and susceptibility to erosion. They

are C.L.I. Class 5 or 6 forest lands. No forestry cutting activity has occurred on these lands.

The steep, strongly dissected slopes are the result of water erosion. All of the Eroded soils in F.L.C. are adjacent to Poplar Creek. Because of the topography, there are no major roads into the area and little or no human disturbance.

Wildlife Habitat Capability

The entire area (100%) is critical spring and winter habitat for elk and critical habitat for moose. Ninety-two percent of the area is critical for beaver, comprising 2.5% of the total critical habitat for this species in F.L.C.

Alluvial (Av) Lands

Alluvial soils are developed from variable textured water-borne sediments of Recent age and make up about 8.8% (114.2 km^2) of the total F.L.C. area. The land is usually gently to very gently undulating and is often poorly drained.

Agricultural and forestry capabilities are Classes 4 and 5 respectively, with forestry limited by excess soil moisture.

Vegetation is highly variable, ranging from herbaceous communities of wetland vegetation to mature trees and tall shrubs. Aspen and balsam poplar are dominant in most stands; however, spruce does well once established.

The most common tall shrubs are willow and alder. Forbs most commonly encountered are fireweed, stinging nettle *(Urtica dioica)*, bishop's cap, mint, and smooth aster *(Aster laevis)*. Sedges and some grasses are also common.

Wildlife Habitat Capability

Alluvial areas are important for wildlife in F.L.C. Twenty-

four percent of the total Alluvial soils make up 10% of the spring critical elk habitat while 17% of these soils account for 5% of the winter critical habitat.

Thirteen percent of these soils provide 6% of critical white-tailed deer habitat, 49% account for 26% of critical moose habitat and 6% accounts for 10% of critical beaver habitat.

Less than 0.01% of alluvial soils provide 8% of the critical habitat for waterfowl. Most of this is adjacent to Gertrude and Campbell Lakes and along the White Fox River.

Five percent of the critical sandhill crane habitat is on 1% of the Alluvial land in the northern portion of F.L.C.

There are very few roads going directly onto Alluvial lands because of the high soil moisture content. Some winter roads pass through these areas to access timber stands on other soil types but most cannot be used after the spring thaw.

Some of the willows in areas of critical moose habitat are becoming over-mature and the amount of available browse will begin to decrease in the next few years.

Organic Soils

Organic soils have developed from partially decayed plant residues that have accumulated in wet or very poorly drained depressions and by the gradual in-filling of lakes by aquatic vegetation. Forestry and agricultural class ratings for organic soils are 6 and 7 respectively showing very severe limitations to productivity. Fens and Bogs occur on Organic soils.

Fens (OF)

Fens form 8.3% (108.9 km^2) of the area and are relatively open rheotrophic peatlands where the organic layer is comprised predominantly of moderately well decomposed sedges. They are minerotrophic and slightly

acidic to alkaline (pH 5.8 - 7.0). Soil water is at the soil surface.

Dominant overstory vegetation in these areas is swamp birch *(Betula glandulifera)*, some black spruce and at times a sparse layer of tamarack. Sedges are the most common plant. Labrador tea, horsetails, bishop's-cap, twinflower and mosses are common.

Wildlife Habitat Capability

The Fen land type is important to wildlife populations because it provides a variety of food, often has open water and has very few access roads.

Fifty-six percent of the Fens in F.L.C. provide 12% of the total critical habitat for elk. Thirteen percent of the critical winter elk habitat is on 49% of the Fens and 12% of the spring critical habitat is on 28% of the Fens.

Fens also provide critical habitat for white-tailed deer, moose, beaver, and sandhill cranes.

Twelve percent of the critical deer habitat is on 27% of the Fens, 15% of the critical moose habitat is on 29% of the Fens and 27% of the critical beaver habitat is on 16% of this land type. The largest area of critical habitat for sandhill cranes (65%) is on 15% of the Fens in F.L.C.

Some of the critical moose habitat on Fens will be decreasing in browse quality in the next few years as the vegetation becomes mature or over-mature.

Bogs (OB)

Bogs form 2.6% (33.9 km^2) of the area. The bogs are ombrotrophic peat-covered or peat-filled areas, generally with a high water table. The water is acidic (pH 3.1 - 4.2) and although the water table is near the surface there is little standing water except in ponds.

When compared to Fens, these areas are nutrient poor and have

less vegetative diversity. The typical vegetation is black spruce, occasionally mixed with tamarack and some willow. The understories are Labrador tea, ericacious shrubs, and mosses, particularly *Sphagnum* spp.

One percent of the cutovers in F.L.C. are on bogs. Most of this occurs where a cutover on another soil type has extended over slightly onto a bog during winter cutting activity.

Wildlife Habitat Capability

Bogs are less important than Fens or Alluvial areas in terms of critical wildlife habitat. Although protection is provided in these areas due to lack of access roads, the food quality is poor. Bogs are used during the summer by deer and elk as areas to escape both the heat and biting insects. Many bog areas are used year round as travel corridors by elk, moose and white-tailed deer, as shown by the very wide and deep animal trails through them.

Three percent of the total critical habitat for elk is on 40% of the Bogs in F.L.C. Four percent of the critical spring habitat is on 27% of the Bogs while 1% of the winter habitat is on 16% of the Bogs.

Four percent of the critical moose habitat is on 22% of the Bogs, 0.2% of the white-tailed deer habitat is on 2% of the Bogs and 2% of the critical beaver habitat is on 5% of the F.L.C. Bogs. There is no critical waterfowl or sandhill crane habitat on these soils.

Drainages (D)

Drainages are complex assemblages of land associated with usually meandering streams and make up 2.8% (36.9 km^2) of the F.L.C. area. The drainages have alluvial deposits and other features of active floodplains and associated valleys.

Most of the drainages in F.L.C. are narrow, winding, steep-sided valleys with intermittent creeks flowing through them. The amount of water running through the drainage is mainly dependent on spring run off

and rainfall, and secondly, on the number of beaver dams. Soil types and texture vary depending on the soil type in which the valley has formed.

The lower slopes of this land type produce mixed stands of willow, red-osier dogwood, rose and high bush-cranberry. Alder, balsam poplar and white birch are along the stream margins. On upper slopes, trembling aspen or sometimes jack pine is dominant with the understory of saskatoon, hazelnut, choke cherry, high bush-cranberry and low bush-cranberry in varying proportions. The herbaceous cover of low lying areas consists of grasses and forbs which can tolerate periodic flooding, most of which have been mentioned when describing vegetation of Fens, Bogs and Alluvial areas.

There are very few access roads on this land type because of the steep slopes. The only forestry activity on drainages is where cutting on the uplands has continued slightly into the valleys. The slopes are also too steep to permit commercial harvest of the trees.

Wildlife Habitat Capability

The Drainage land type provides important habitat for all wildlife species for which critical habitat was delineated in F.L.C. Valuable habitat is also provided for aquatic and semi-aquatic species, and for many birds which rest and feed in emergent aquatic or riparian shrub and tree vegetation.

Sixty-four percent of the drainages provide 5% of the total critical habitat in F.L.C. Fifty-nine percent of the land type contains 6% of the critical winter elk habitat while 49% contains 7% of the critical spring habitat.

Two percent of the critical white-tailed deer habitat is on 11% of the drainages, 4% of the critical moose habitat is on 25% of the drainages, while 26% of the critical waterfowl habitat is on 7% of the drainages and 6% of the critical sandhill crane habitat is on 4% of the drainages. Drainages are the most important habitat for beaver with 60% of them supporting 33% of the critical habitat for this species.

Meltwater Channel (MC)

The land type occurs only in the form of a complex with a Drainage (D-MC). The only meltwater channel in F.L.C. is the one containing the Saskatchewan Rivers which is 8.3 km^2 in area.

Meltwater channels were formed by rapidly flowing glacial rivers that carved wide, U-shaped valleys into the glacial till. Post-glacial erosion and deposition have altered the topographic expressions of these channels to some extent. Channel walls are frequently dissected by ravines and gullies, and localized areas of slumping occur on the steeper slopes. Valley floors are generally flat and covered with variable textured alluvial deposits. Moisture conditions vary widely along the valley floors. Slope failures on the inside of channel meanders frequently contain deposits of sands and gravels. Surface drainage varies from excessive on steep valley walls to very poor on flat valley floors.

Variable topographic expression on the Meltwater Channel land type results in diverse vegetation communities, ranging from xeric grasslands and low shrubs on steep, south-facing exposures, to mixed stands of trees and tall shrubs on north-facing slopes and in ravines and gullies. Vegetation on the valley floor is also variable. Floodplains and other alluvial deposits associated with post-glacial drainages are generally characterized by a mixture of tall shrubs and trees (see Alluvium and Drainage land types for species compositions and distributions). On valley floors lacking permanent surface water, woody vegetation is less extensive. A mixture of grasses and forbs dominate wet meadow communities in areas where spring flooding is of short duration. Semi-permanent wetlands generally support tall marsh vegetation with peripheral stands of willow and red-osier dogwood.

Two oxbow lakes on the west side of F.L.C. combine alluvial land type characteristics and vegetation with those of the steeply sloping xeric grassland of a meltwater channel. These have been complexed as AV-MC.

Wildlife Habitat Capability

The Saskatchewan River is not part of F.L.C. but because of its importance to wildlife it has been included in this discussion.

The only mapped critical wildlife habitat on the Saskatchewan River is for beaver (5.5 km^2) and for great blue herons.

There are four heron colonies along the River west of Highway 6. Two of the colonies are either on or adjacent to Thompson Island while the other two are further upstream. The three colonies closest to the highway will likely be affected by either the flooding or by an influx of people using Codette Reservoir.

5.1.2 Major Water Bodies

There are 4.1 km^2 of permanent water bodies in F.L.C. (0.3% of F.L.C. area). These areas are critical habitat for elk, moose, deer, beaver, waterfowl and sandhill cranes.

Eighty-six percent of these waterbodies provide 0.7% of the total critical habitat for elk. There is no critical winter elk habitat here but 100% of these water bodies provide 2% of the critical spring habitat for white-tailed deer. Ninety-five percent of this land type supports 2% of the critical moose habitat, 76% of it is 5% of the critical beaver habitat and 65% of it is 11% of the sandhill crane critical habitat. The largest area of critical waterfowl habitat (66%) is on 60% of the permanent water bodies.

5.1.3 Critical Wildlife Habitat Outside of F.L.C.

In addition to the critical wildlife habitat inside of F.L.C., there are a number of areas outside of the boundaries that are also critical for various species. These have been listed in Table 8 and have also been mapped.

The critical habitat for beaver outside F.L.C. is a 5.5 km^2 area

on the Saskatchewan River that has already been mentioned under Meltwater Channel. The critical habitat for waterfowl consists of the Saskatchewan River, permanent waterbodies north of F.L.C., the White Fox River and Gertrude and Campbell Lakes. These two lakes are also critical sandhill crane habitat. Critical elk habitat has been mapped and consists mainly of wooded areas adjacent to F.L.C. or wooded areas close to F.L.C. but surrounded by cultivated fields.

Although moose do frequent the areas outside Fort a la Corne's boundaries these areas are not considered critical moose habitat. The opposite is true for white-tailed deer. These animals use the forest fringe extensively making the total surrounding area very important, especially on the east side, which is mapped as critical on the Critical Wildlife Habitat Maps.

Table 8. Approximate areas (km^2) of critical wildlife habitat adjacent to the Fort a la Corne Provincial Forest and Wildlife Management Unit.

Elk	#1 spring	20.4 km^2	
	#2 spring	25.9 km^2	
	TOTAL SPRING		46.2 km^2
	#1 winter	14.5 km^2	
	#2 winter	39.2 km^2	
	TOTAL WINTER		53.8 km^2
Beaver			5.5 km^2*
Waterfowl			2.6 km^2**
Sandhill Cranes			0.2 km^2

* - is habitat along the Saskatchewan River spanning a total distance of 11.2 km.

** - consists of 1.2 km^2 of waterbodies and 1.4 km^2 of river habitat.

5.1.4 C.W.H. on Cutovers

Area determinations of critical wildlife habitat for ungulates on cutovers were compiled. These were done on the basis of whether or not the area had silvicultural treatment performed and on the basis of the land type on which work had been done. The results are shown in Table 7. These were done to form the basis for continuing work on wildlife use of cutovers.

5.2 Land Use

5.2.1 Forestry

Forest Inventory

The Forestry Branch, D.P.R.R. classifies the F.L.C. forest according to three categories. These categories include: a) forested productive land b) non-forested productive land and c) non-productive land.

A. Forested Productive Land

Forested productive land includes the area currently available for merchantable harvest, and encompasses 98 370 ha. Softwood stands predominate, comprising 49% of the total productive area in F.L.C. The majority of the softwood area are jack pine stands (80%), followed by black spruce (13%) and tamarack (4%). White spruce and black spruce/ jack pine stands form the remaining 3% (Table 9).

Mixedwood forest covers 9 222 ha or 10% of the productive land, 3 518 ha of which are softwood dominated, and 5 704 ha are hardwood dominated. Jack pine is the major dominant species in the softwood-dominated areas, with trembling aspen as sub-dominant. In the hardwood-dominated mixedwood, trembling aspen is almost exclusively the dominant species, with jack pine as sub-dominant (Table 9).

Hardwood stands encompass 40 604 ha, or 41% of the productive forested area of F.L.C. Hardwood stands are almost exclusively trembling aspen, although small stands of black poplar and white birch do occur

Table 9. Major species composition of softwood, mixedwood and hardwood stands in F.L.C.

Softwoods	Hectares	% of Total Area
White spruce	541.7	
Black spruce	6 517.6	
Jack pine	38 873.9	
Tamarack	1 891.3	
Black spruce/jack pine	671.0	
	48 495.5	49.3%
Mixedwood (softwood dominant)		
Spruce - trembling aspen	874.6	
Jack pine - trembling aspen	2 643.4	
	3 518.0	3.6%
Mixedwood (hardwood dominant)		
Trembling aspen - spruce	1 636.5	
Trembling aspen - jack pine	4 060.9	
Black poplar - spruce	6.3	
	5 703.7	5.8%
Hardwood		
Trembling aspen	40 603.8	
Black poplar	23.0	
White birch	25.8	
	40 652.6	41.3%
TOTAL	98 369.8	100.0%

(Table 9).

Table 10 shows the Crown closure densities and height classes of the stands in the forested productive areas of F.L.C. In general, the stands are evenly split between the two height classes (5 and 10) below 12.5 meters, and the two height classes (15 and 20) above 12.5 meters. Similarly, approximately half the mixedwood stands have crown closure densities less than 55% (Classes A & B) while the other half have densities greater than 55% (Classes C & D). Crown closure density of 69% of the softwood stands, and 90% of the hardwood stands, however, is greater than 55%.

Studies of forestry-ungulate relationships (Hunt 1977, Hunt and Phillips 1978) have indicated that a diversity of forest types and succession stages are necessary for prime big game range. Therefore, the forest species composition data of F.L.C. indicates a desirable species diversity is present. However, field observations and the predominance of high density crown cover in the pure hardwood and pure softwood stands indicate that many areas are mostly mature and overmature, and do not provide optimal habitat.

B. Non-Forested Productive Land

Open land, scrub brush, and cutover areas are the major constituents of the 8 405 ha of non-forested productive land. Forty-two percent of the area is open land, almost all of which has resulted from succession following the major 1967 fire. Twenty-five percent of the non-productive area is classified as brushland, which also includes some of the burned over area, as well as edge along the Saskatchewan River. Cutover areas make up the remaining 33%, almost half of which was cut during the 1970-75 period. Most of the intensively cutover areas are along the major roads and a significant amount of logging was done adjacent to the 1967 burn area during 1967 and 1969/70.

A summary of forest fires in F.L.C. are given in Table 11.

Table 10. Canopy densities and height classes of forested productive stands in F.L.C.

Softwoods

Crown Closure Density			Height Class		
	Meters	%		Meters	%
A -	3 486.7	7.2	5 -	7 659.1	15.8
B -	11 791.6	24.3	10 -	20 273.0	41.8
C -	23 223.5	47.9	15 -	16 144.8	33.3
D -	9 993.7	20.6	20 -	4 418.6	9.1
			25 -	-	-
	48 495.5	100.0		48 495.5	100.0

Mixed, Softwood Dominated

A -	441.8	12.6	5 -	863.7	24.6
B -	1 541.0	43.8	10 -	1 229.7	34.9
C -	1 478.1	42.0	15 -	1 109.0	31.5
D -	57.1	1.6	20 -	315.6	9.0
			25 -	-	-
	3 518.0	100.0		3 518	100.0

Mixed, Hardwood Dominated

A -	106.6	1.9	5 -	1 041.4	18.2
B -	2 546.9	44.7	10 -	1 954.6	34.3
C -	2 626.1	46.0	15 -	2 412.4	42.3
D -	424.1	7.4	20 -	295.3	5.2
			25 -	-	-
	5 703.7	100.0		5 703.7	100.0

Hardwood

A -	156.3	0.4	5 -	4 724.6	11.6
B -	3 734.4	9.2	10 -	12 350.7	30.4
C -	22 347.9	55.0	15 -	19 950.3	49.1
D -	14 414.0	35.4	20 -	3 627.0	8.1
			25 -	-	-
	40 652.6	100.0		40 652.6	100.0

Table 11. Summary of forest fires within F.L.C. from 1943 to present.

Year	No. of Fires*	Area (hectares)
1943	3	268
1945	1	30
1946	6	703
1947	4	66
1950	3	181
1951	1	323
1952	2	42
1955	1	73
1957	3	4
1958	6	404
1959	1	12
1960	1	3
1961	1	3
1962	2	328
1963	3	7
1964	2	30
1965	1	6
1966	2	855
1967	2	16 523
1969	1	1
1971	1	1
1974	1	1
1976	2	1
1977	3	21
1978	2	18
1979	2	1
1980	2	45
1981	3	55
1982	5	35
1983	2	6
Total	71	20 046

* Fires under .2 ha are not listed.

C. Non-Productive Land

Non-productive land in F.L.C. encompasses 18 510 ha. The two major land types are brushland, which comprises 49.5% of the area, and treed muskeg which accounts for 24.5%.

The various non-productive land cover types are often located along intermittent water channels. Large expanses of brushland interspersed with clear muskeg are situated along the northern boundary of the west side of F.L.C., and in the eastern half of the forest; clear and treed muskeg cover most of the land along the northern boundary. Table 12 lists the non-productive land types and their calculated areas.

Table 12. Areas of Land Types Non-Productive for Forestry.

Land Type	Area (ha)
Treed Muskeg	5 449
Clear Muskeg	2 796
Brushland	8 616
Meadow	344
Clearing	416
Flooded	881
Non-Productive Burnover	8
	18 510

Note: Lakes and stream occupy an additional 531 ha.

D. Forest Harvest

Merchantable products from F.L.C. in order of priority include poles/posts, ties, sawlogs, shingle bolts, laths, and pulp. This designation assigns priority use to stands that may be suitable for more than one product. Most merchantable stands (72%) in F.L.C., however, are suitable for pulp.

F.L.C. can be separated into three blocks according to timber harvest allocation:

i) East of Highway 6: This block is primarily for farm (settler) permits with little personal (field permit) use except for birch for which it is a major area. Some ties have been extracted.

ii) South of Saskatchewan River and west of Highway 6: This is primarily harvested for fence posts by Saskatchewan Forest Products Corporation (S.F.P.), with additional high use from farm permit holders.

iii) Main block: This area supports multiple-use with much utilization for ties, farm permits, pulp and posts, and some field permit use.

Quotas set in the 1976 Forestry Management Plan were adhered to in harvesting any of the merchantable stand in F.L.C. until 1984 when a new plan and updated quotas were set. The new plan provides that the annual timber quotas shown in Table 13 are to be implemented in F.L.C. on a continuing basis (Phillips pers comm.).

Table 13. Annual Timber Quotas for F.L.C. as of 1985.

Product	Amount
Ties	11,000 pieces
wS farm permits	62,500 f.b.m Nipawin district 50,000 f.b.m Melfort district
Posts	320,000 - Sask. Forest Products 60,000 others
Saw timber	20,000 f.b.m per individual

Note: At this time, no commercial white spruce harvesting will be permitted in F.L.C.

Clearcutting continues to be the policy in the revised plan, except where good forest management dictates selective cutting or where areas are managed on a marked tree basis. However, the methods of cutting have been changed and improved upon. When clearcutting started in F.L.C. in the late 1960's, the cuts were marked out in regularly shaped blocks, a faster and easier method of operating during this high demand period. Sask. Forest Products is now cutting in irregularly shaped blocks and

following natural boundaries.

Harvest will be aimed at mistletoe infested areas, now that the mistletoe inventory has been completed in all but Management Unit #4, the area east of Highway 6.

Preliminary analysis of the mistletoe inventory indicates that 4 560 ha require treatment and 720 ha require planting. Areas designated for treatment include those that are very sparse with little forest growth, infected plantations and areas believed to be understocked. Drum-chopping, hand clearing, planting or prescribed burning are possible techniques to be applied to these areas.

5.2.1.2 Silviculture

Forestry Branch has been planting jack pine cones and seedlings in plantation areas on the west side of F.L.C. since 1940. Seventy-nine percent of the 1 181.7 ha of these plantations were planted from 1968 to 1972. Since 1972 over two million seedlings have been planted. One additional 65 ha plantation is along the White Fox River on the north boundary beyond the 1969 burn area. However, survival rates of seedlings are considered poor (Neggers 1984). The majority of these stands are presently classified as 5A and 5B jack pine.

No planting has been done in any of the larger clearcuts or burns other than in the west end, but scarification was practiced on 250.2 ha in 1975 and 1977 and 202.5 ha in 1982 and 1983. Post-scarification regeneration is variable and Forestry Branch is conducting ongoing vegetation transects to monitor regrowth.

Some experimental thinning of jack pine regrowth was carried out during the winter of 1982-83 in the 1967 burn area.

A summary of recent silviculture activities in F.L.C. is presented in Table 14.

Table 14. Summary of recent silviculture activities in F.L.C.

A. Planting

The Number of Seedlings Planted in F.L.C.

Year	Seedlings	Tublings
1968	266,250	41,800
1969	230,000	60,000
1970	299,000	87,200
1971	848,000	25,000
1972	81,250	-
1973	456,965	-
1974	91,025	-
1975	-	-
1976	131,500	-
1977	4,000	-
1978	414,000	-
1979	489,000	-
1980	468,000	-
1981	-	-
1982	-	-
1983	-	-
TOTAL	3,778,990	214,000

B. Scarification Activities**

Year	Area (ha)	Location
1982	40	North of River
1982	120	South of River
1983	40	North of River
TOTAL	200	

** Data is not available prior to 1982.

5.2.1.3 Access Trails

Table 15 shows that there is a total length of 1 507 km of various roads and trails in F.L.C.

Table 15. Total Length of Access Roads in F.L.C.

Class 1 Roads	Km
Division Road	85.1
Lars Road	15.5
Fort House Road	14.8
Wapiti Trail	14.8
Highway #6	14.4
Inland Road	13.5
Torch Trail	10.9
Grid Roads Extending Into F.L.C.	7.1
Saskatchewan Forest Products Access Road	4.2
Riverhouse Road	4.1
Sub Total	184.4 km
Class 2 Roads	222.1
Class 3 Roads	250.3
Class 4 Roads	850.2
Sub Total	1322.6 km
TOTAL	1507.0 km

The problem of the proliferation of forest roads is being addressed by both Wildlife and Forestry Branches of D.P.R.R. One forestry company, S.F.P., is voluntarily closing roads after work in an area is completed.

Employment by the Forest Industry

P.A.P.C.O. and S.F.P. are the only large operators in the forest industry in F.L.C. Most of this employment is seasonal. Small operators, also on a seasonal basis, employ twice as many people as the large companies. Forest-related employment relies mostly on the local agrarian labour force for whom forest employment augments farm income (Neggers

1984).

The number of seasonal employees and their employers working on harvesting timber in F.L.C. in 1981-82 is summarized in Table 16.

Table 16. Seasonal Employment by Forestry Industry in F.L.C.

	Seasonal Employment	
Timber Operation	1981-82	1982-83
Large Operators:		
P.A.P.C.O.	30 people	30 people
S.F.P.	20-25 people	25 people
Small Operators:		
Lehner Woods	1 person	1 person
Independent Sawmills	75 people (20 sawmills)	75 people (20 sawmills)
Tie Mills	25-30 (8 sawmills)	30 people (8 sawmills)
Vermette	-	3 people

(Source: Neggers 1982, 1984)

5.2.2 Use of F.L.C. By Local Indian Bands

Letters from the two local Indian bands, the Muskoday and James Smith bands, indicated they both wished to be part of the planning and ultimate implementation of the Wildlife Master Plan for F.L.C. They also want to have input into future natural resource management and planning in the area, including future recreational developments that may occur. To accomplish this, they suggest that a resource management team be established with members appointed from both Indian bands. Securing employment opportunities for local native people was another concern expressed by both bands (Appendix 10).

The James Smith band which currently has exclusive access to trapping in F.L.C. wishes to have a Trapping Association formed, and a Fur Management Plan implemented by a local native person. They also

expressed interest in developing projects such as wild rice farms, animal farms and a wildlife sanctuary (see Appendix 9).

Fifteen band members of the Muskoday Reserve responded to a questionnaire designed to determine the extent of their use of wildlife in F.L.C. (15% response rate). A summary of their responses is given in Table 17.

James Smith band members completed 37 questionnaires (19% response rate), and 11 trappers also responded to an additional questionnaire. A summary of this information is provided in Table 18.

Suggestions to improve the present fur management program in F.L.C. by trappers from the James Smith band include: a) hiring a local trapper to implement and administer a Fur Management Plan b) hiring of local Indian people as Conservation Officers to enforce relevant game regulations c) damming more lakes to enhance muskrat production and d) increasing lynx and martin numbers by transplanting them from other areas.

The results of the questionnaire indicate that members of both the James Smith and Muskoday (John Smith) Reserves depend on the Fort a la Corne Management unit for many of their activities. The James Smith band in particular uses F.L.C. for many activities during all times of the year. The reported big game harvest of moose (26) and elk (39) is similar to that of the regular licensed harvest. In addition, the F.L.C. area is very important to Indian people as a source of white-tailed deer, small game, berries, recreation, firewood and lumber.

5.2.3 Agriculture

Except for a few small areas (80 ha total) where cultivation extends into the forest, there are no cropped fields in Fort a la Corne. One area of less than 30 ha (NE 11-51-18-W2) has been broken in the past and seeded to brome grass *(Bromus inermis)* and crested wheatgrass *(Agropyron cristatum)*. The area has not been used as a hay or grazing lease for a number of years (DPRR, Prince Albert Region files).

Table 17. Summary of Responses to Questionnaire Regarding Use of Fort a la Corne - Muskoday (John Smith) Band.

USE		
4		Hunting
3		Fishing
1		Trapping
4		Berry Picking
2		Firewood
9		Visiting
FREQUENCY OF USE		
-		Every Day
1		Every Week
1		Every Month
7		Every 6 Months
4		Once a Year
1		Never
1		Every 5 Years
NUMBER OF WILDLIFE TAKEN EACH YEAR		
1		Moose
2		Elk
7		Deer
lots		Birds
14		Small Animals
10-200		No. Animals Poached
Most within 50 km Fort		Location of Poachers
190 (20-100)		Animals Taken by Indians Outside John Smith
Most within 50 km Fort		Location

Table 18. Summary of Responses to Questionnaire Regarding Use of Fort a la Corne - James Smith Band.

USE		FREQUENCY OF USE		NUMBER OF WILDLIFE TAKEN EACH YEAR		TRAPPERS No. Animals Captured	
Hunting	33	Every Day	4	Moose	26	Beaver	40
Fishing	17	Every Week	12	Elk	39	Muskrat	10
Trapping	14	Every Month	9	Deer	140	Squirrels	200
Berry Picking	29	Every 6 Months	7	Birds	132	Lynx	1
Mushroom Picking	1	Once a Year	4	Small Animals	1463		
Firewood	28	Other (Year Round)	1	No. Animals Poached	10-200		
Lumber	5			Location of Poachers	Majority Within 50 km		
Visiting	15			Animals Taken by Indians Outside James Smith	20-100		
Picnicking	1			Location	Mostly Within 50 km		
Digging for Medicine Herb Picking	3						

Hay permits were not issued in F.L.C. in the last two years but a number of grazing leases have been issued (Table 19). The majority of the leases are delineated by section or quarter section lines, but some use a trail or a drainage for the boundary and are irregularly shaped (Figure 8).

Table 19. Total Area and Number of Grazing Leases and Number of Animals Grazed in F.L.C. by Enforcement District (D.P.R.R., Prince Albert Region files).

District	Size of Lease	# of Leases	# of Animals
	1982		
Melfort	389 ha	3	50
Nipawin	194 ha	2	40
Prince Albert	1490 ha	5	117
	2073 ha	10	207
	1983		
Melfort	583 ha	4	95
Nipawin	194 ha	2	41
Prince Albert	390 ha	3	52
	1167 ha	9	188

The carrying capacity of the lease is determined by DPRR district staff. After the carrying capacity is set, the farmer pays a set fee for the permit and an additional rate per animal. Leases must be renewed annually.

One permit to grow wild rice was issued for 1983 for Campbell Lake (4-51-16-W2). This is the only year when any rice permits have been issued for F.L.C. (Figure 8).

5.3 Wildlife

5.3.1 Wildlife Inventory

Ungulates

Table 20 shows the number of elk, moose, and white-tailed deer that were seen during the 1982-83 winter survey in each stratum and the

extrapolationed total population estimates for F.L.C. No mule deer were identified during the study.

Table 20. Number of Animals Observed in Each Stratum During the February 1983 Aerial Survey of Fort a la Corne Wildlife Management Unit.

Stratum-Expected Animal Densities	Number of Blocks Flown	Number of Animals Recorded Elk	Moose	WT Deer	Total
High	26	168	67	67	302
Medium	33	94	55	121	270
Low	16	31	12	43	86
Very Low-0	0	0	0	0	0
Total	75	293	134	231	658
Total Population Estimates		477 ± 27%	243 ± 24%	N/A	N/A

The highest concentration of elk, 74.7%, and moose, 69.4%, were found in the pure hardwood stands (Table 21). Of these hardwood stands, the densest cover types, (above 55% crown cover), the C and D stands, appear to be the most significant for winter range. The fringe and adjacent agricultural areas were not included in the survey. The monitoring data suggest that a significant portion of the resident elk herds spend time during winter and spring outside of F.L.C.

Mean or average herd size for elk is suggested to be inversely proportional to winter severity (Rounds 1980; Hunt 1981). However, despite a mild winter in 1982-83, the largest number of elk sighted in one herd was 31, and the mean was 3.7 elk per herd in the high density stratum (Figure 13). These numbers are considerably lower than those recorded in the eastern commercial forest during the average winters of 1977-78 when the mean was 4.4 elk per herd or 1974-75 when the mean was 6.0 elk per herd (Hunt 1981).

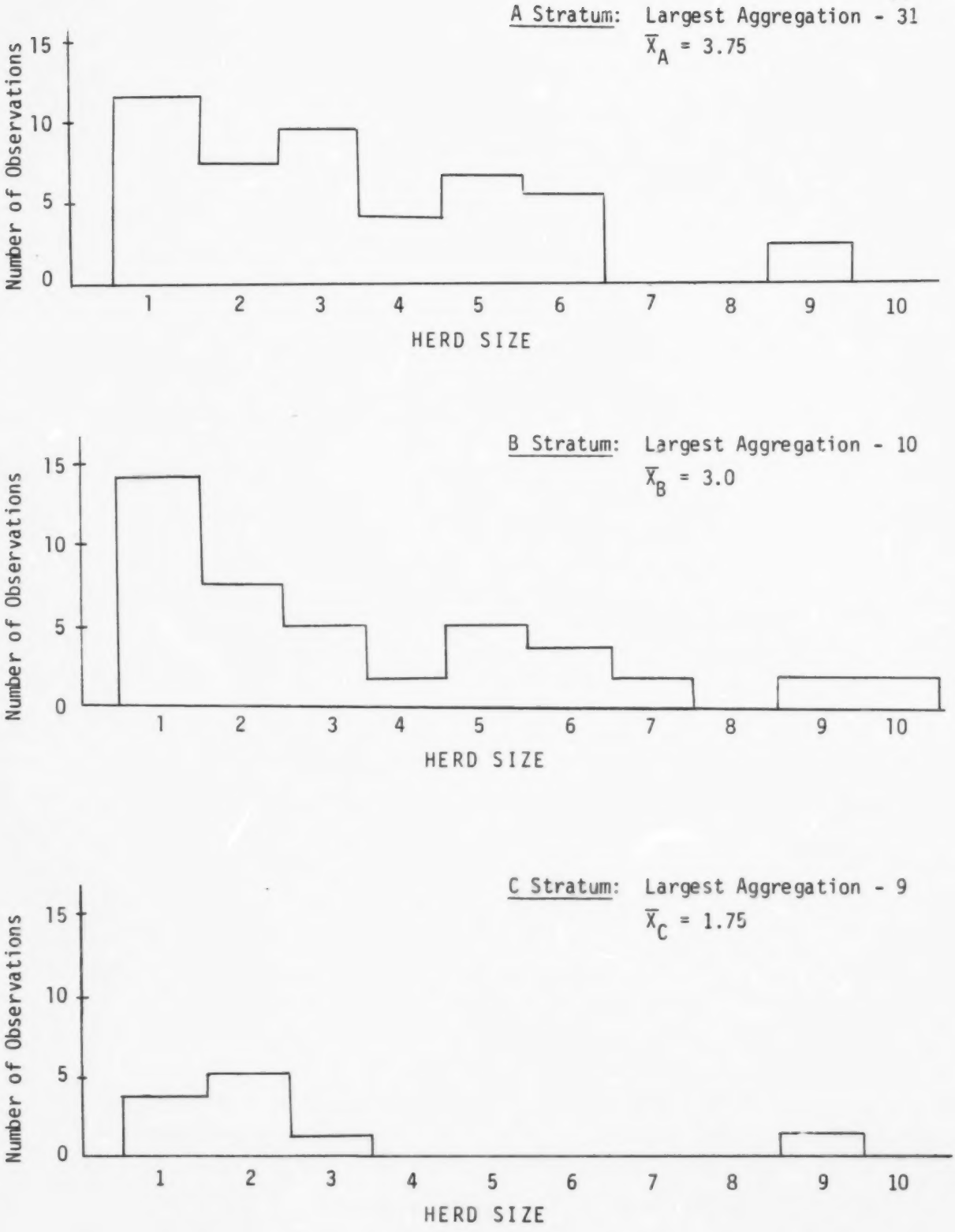


Figure 13. Histograms showing elk herd size or aggregrates in each of the three stratum in F.L.C. Aerial survey, February 1983.

Table 21. Numbers and Percentages of Elk and Moose Observed in Each Cover Type/Density During the Fort a la Corne Wildlife Management Unit Aerial Survey February 1983.

Cover Type	Density*	Elk		Moose	
		Number	%	Number	%
Hardwood	A	0	0.0	0	0.0
	B	34	11.6	4	3.0
	C	108	36.8	60	44.8
	D	77	26.3	29	21.6
	Total	219	74.7	93	69.4
Softwood	A	4	1.3	2	1.5
	B	16	5.5	5	3.7
	C	13	4.4	8	6.0
	D	14	4.8	3	2.2
	Total	47	16.0	18	13.4
Mixedwood	A	0	0.0	1	0.8
	B	4	1.3	0	0.0
	C	0	0.0	4	3.0
	D	5	1.7	0	0.0
	Total	9	3.0	5	3.8
Willow/tL Swamp		15	5.1	15	11.2
Cutover/Clearing		0	0.0	3	2.2
Unknown		3	1.0	0	0.0

* Cover type densities are based on provincial forestry criteria of canopy or overstory closure.

Age and Sex Survey:

During aerial surveys throughout the winter, a total of 140 moose and 247 elk were observed and identified. Approximately one-half of the total moose and elk estimated populations within F.L.C. were observed during the age and sex count. Table 22 indicates the age and sex distribution. The bull/cow/calf ratios shown in this table appear to be

adequate to assure population stability with a high potential for herd increase.

Table 22. Age/Sex Distribution of Elk and Moose in F.L.C. as Observed During December 1983 Aerial survey.

Species	Sample Size	Bulls	Cows	Calves	Bulls/Cows/Calves
Moose	140	29	67	44	43.3/100/65.7
Elk	247	53*	133	61	29.8/100/45.9

* Sample size includes 36 mature bulls and 17 immature or spike bulls. This provides a ratio of 27.1 mature bulls/100 cows.

The ages as determined from incissors indicate a young population. The oldest animal trapped was 12.5 years (Figure 14). The juvenile component is high, as was also seen from the age sex survey. The hunter kill data obtained by the telephone survey show an elk population age distribution from six months to 15.5 years (Figure 15). The major harvest component was reported to be in the 5.5 to 7.5 age category.

Habitat Use:

The spring calving survey showed that elk calving occurs in a variety of habitats. Common elements associated with calving habitats were nearby fresh water, heavy timber cover, and good foraging areas. Little use was made of sandy jack pine and open timber stands. Elk preferred the river valley and adjoining creek beds, and beaver dam meadows with abundant grass and sedge cover. Timbered coulees with adjacent alfalfa or clover fields were frequented by single females and yearling female groups during spring calving. The large areas of organic terrain in the northeastern and northwestern parts of F.L.C. also represent preferred spring ranges (see Critical Habitat map).

Data obtained from radio-collared elk indicated a possible calving area near the dam site, an area of high human activity, which will be flooded when Codette Reservoir is filled.

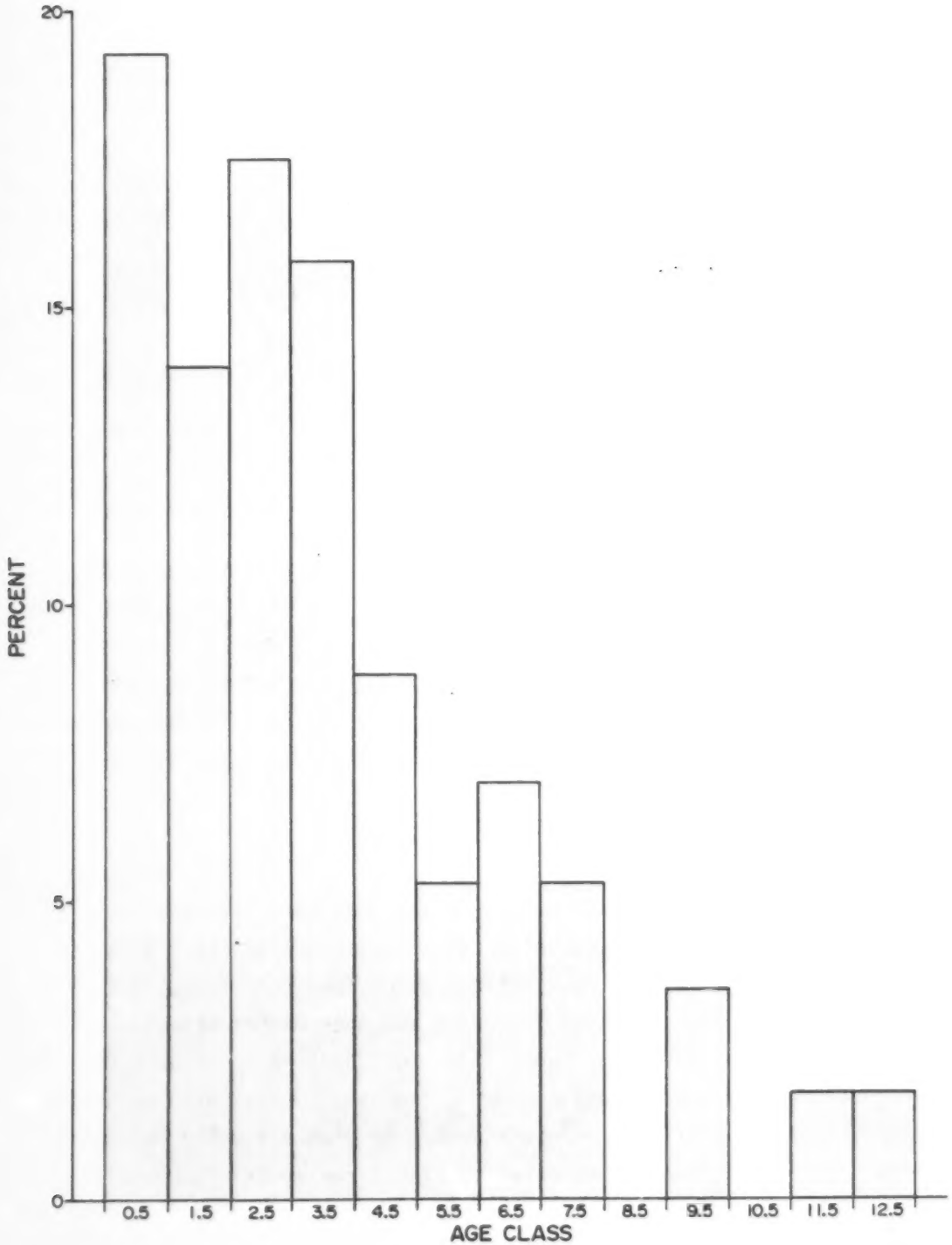


Figure 14. Age Structure of Live-Trapped Elk.

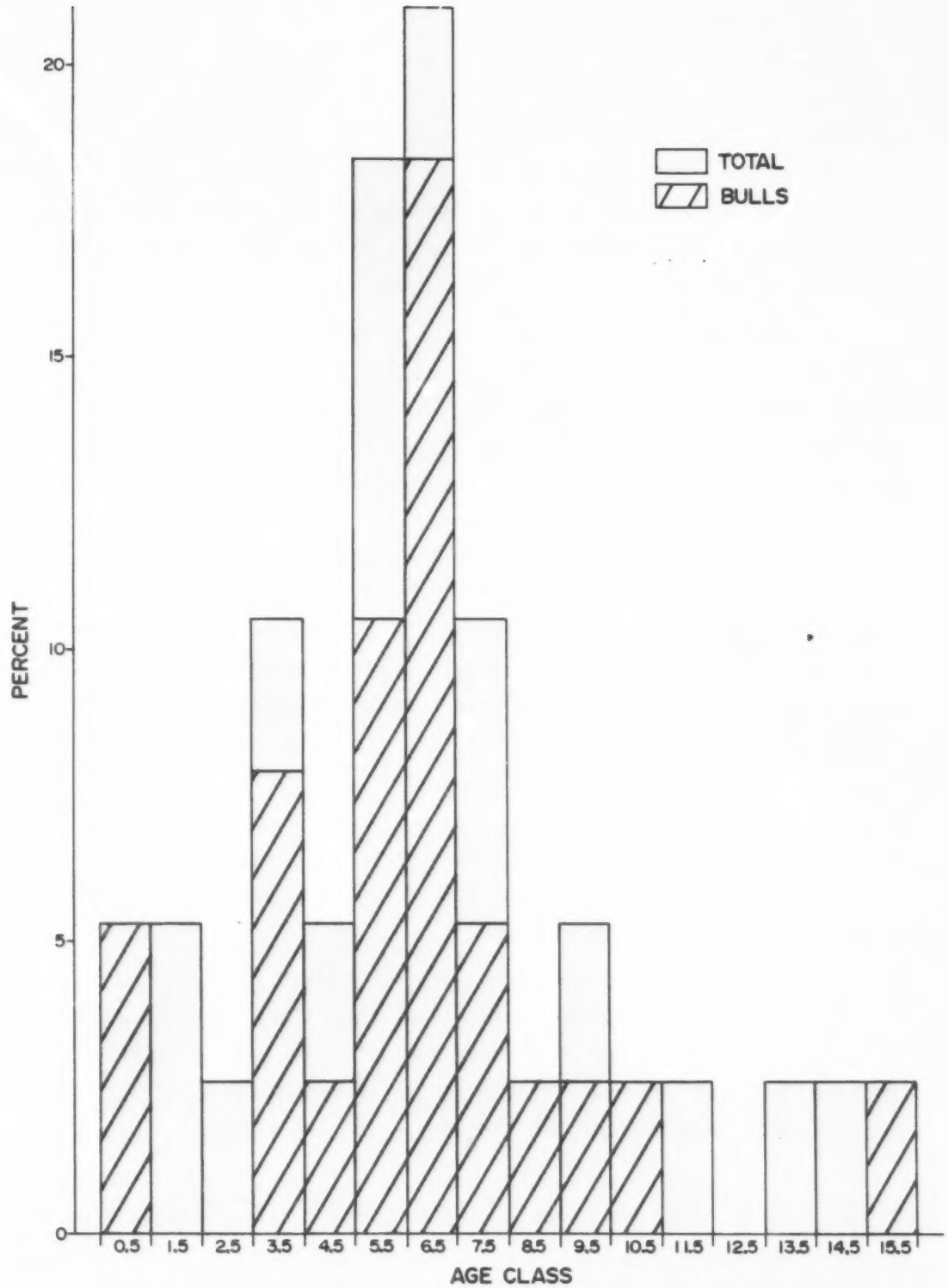


Figure 15. Elk Hunter Kill Data, 1982 and 1983.

Moose selected primarily the open aspen stands, mixed willow meadow complexes and the river valley. Agricultural fields were not important to moose. In spring, moose concentrated along the river, feeding on young browse species and in open Fens and along water courses. Wet meadows with willow cover also provided favourable habitat for moose during early spring. White-tailed deer occupied more upland habitat and tended to frequent the agricultural land.

Environmental factors, such as snow depth, prominently influences deer and probably elk distribution during severe winters. Proximity to fresh water, however, greatly influences elk and deer habitat selection. Areas of heavy human activity, as indicated by trail and road usage, were avoided by all ungulates. Isolated areas seemed to be preferred during spring, particularly by elk and moose.

Fur:

Information obtained during the beaver and muskrat survey showed that beaver are abundant in F.L.C. and commonly observed along the river. The observations suggested that beaver are able to establish colonies along the natural river course, but that numbers increase if river flows and ice-scouring are decreased, as evidenced by the increased number of lodges toward Tobin Lake where water speed is reduced. Individual sightings of animals were too numerous to map; therefore, only general information is noted on the Critical Habitat map.

Beaver were abundant on small tributary streams in the study area, particularly those originating in F.L.C. The Saskatchewan River is considered marginal habitat which supports some surplus animals from peripheral areas. However, it is also an important avenue of dispersal by which beaver gain access to the many tributary streams.

In terms of numbers, the muskrat is the second most abundant animal in the F.L.C. fur catch, but the river is not an important part of its habitat. A few bank-dwelling muskrats were noted in shallow channels adjacent to the two islands in the study area, and transient animals were occasionally seen elsewhere on the river. The species is

most abundant in the larger shallow lakes and in marshes on the uplands.

Waterfowl

Few waterfowl were observed during the July, 1983 canoe survey of waterfowl broods. There was a single brood of Canada geese *(Branta canadensis)*, sixteen broods of ducklings, and two broody females observed along the 102 km of river surveyed. A summary of the results of this survey is given in Table 23.

Table 23. Waterfowl Brood Survey Conducted Between LaColle Rapids and the East Boundary of F.L.C., July 23 and 24, 1983.

	Canada Geese	Merganser *(Mergus merganser)*	Common Goldeneye *(Bucephala clangula)*	Mallard *(Anas platyrhynchos)*	Wigeon *(Anas americana)*
No. of Broods	1	5	5	7	1
No. of Young	8	28	18	36	3
No. Young/Km. River	0.08	0.27	0.18	0.35	0.03

It appears from this table, that dabbling and diving ducks occur with equal frequency. However, all mallards (dabblers) observed were found in the riffles and pools formed behind the two major islands, Inkster and Thompson. These islands account for only 3 km of the total distance surveyed, but their productivity is substantially higher, at 14 ducklings per km, than the remainder of the river. Many expected duck species were not represented in this survey, but had been previously observed with broods on the river and on many of the larger beaver ponds and lakes throughout F.L.C. These other water bodies represent a smaller productive area than the river, but are probably equally important for waterfowl production. The Canada Land Inventory (Murray and Matthews 1974) rates this portion of the Saskatchewan River as Class 6 to 7 for waterfowl

productivity, primarily because of its lack of suitable shoreline due to the speed of the current.

During the autumn aerial survey of the North Saskatchewan, the Saskatchewan, and Whitefox Rivers, and 4.1 km^2 of permanent water bodies within the F.L.C. area, a total of 865 Canada geese were counted. These birds were staging on the Saskatchewan River and Campbell Lake, which were also the most important for staging ducks, with 616 of 842 birds counted observed there. In a provincial context, F.L.C. is not important for breeding, moulting, or staging waterfowl. Within the area, Gertrude and Campbell Lakes are the most important production areas and the Saskatchewan River and Campbell Lake are the most important staging areas. The Gertrude and Campbell Lakes area is also significant in that this is one of the few places south of the Boreal Forest where sandhill cranes nest in Saskatchewan.

After the formation of Codette Reservoir, an increase in the number of birds nesting in the river valley is anticipated. If lack of suitable shoreline and the rapid current are the main reasons for low production levels, the more gradual shorelines that will be formed along some areas on the reservoir and the slower current will be beneficial to nesting success of some waterfowl species.

An increase in the numbers of staging waterfowl is also anticipated. Increased staging may cause additional crop damage in the area. Areas of land that S.P.C. has purchased may be good areas to consider for establishment of permanent lure crops.

Other Birds

Ruffed grouse drumming counts have been conducted annually by D.P.R.R. since 1980. Transects have been established within F.L.C. along Division and Inland Roads. The 1982 and 1983 trend data indicated that the population is low to very low in this area. Ruffed grouse were at a provincial low in 1983 (T. Weins pers. comm.) but are now starting to increase in numbers.

Spruce grouse *(Dendragapus canadensis)* were seldom encountered by the study team, during the two year study. Although the surrounding agricultural lands are more important to sharp-tailed grouse *(Tympanuchus phasianellus)* and grey partridge *(Perdix perdix)* for habitat than F.L.C., observations of both species were made at a jack pine plantation near the west end north of Division Road. No other data were obtained for the two species.

Non-Game Birds

Several significant bird observations were made. For example, turkey vulture *(Cathartes aura)* were seen frequently along the river and its tributaries. The common loon *(Gavia immer)*, although only a rare nester in the area, was recorded as having reared young on both Gertrude and Campbell Lakes in 1983, as well as on two old river meanders within F.L.C. The boggy shorelines and surrounding areas of Campbell and Gertrude Lakes also make them very suitable for nesting sandhill cranes and Canada geese. Four active heron colonies were found during 1982 and 1983, all along the river.

Bald eagles may be nesting along the river. Three birds, two of them adults, were observed during the river waterfowl brood survey. Ospreys *(Pandion haliaetus)*, were observed early in the spring of 1983 in the study area, but no nesting activity was noted. In February and March, 1983, a pair of great grey owls *(Strix nebulosa)* were frequently seen in tamaracks along Highway 6, but their nest could not be located. Cliff and bank swallows *(Hirundo pyrrhonota* and *Riparia riparia)*, the two passerine species most affected by the future reservoir filling, are colonially nesting all along the river, inside and outside of F.L.C.

5.3.2 Wildlife Harvest

F.L.C. supports at least 15% of the provincial elk population, excluding Prince Albert National Park (Hunt 1981). The area is well

known for its moose, white-tailed deer, and elk hunting. The moose and elk licenses are allotted on a draw basis, while white-tailed deer hunting is not limited.

The first big game season on record was in 1940 for elk and 1959 for moose (D.P.R.R. files). In 1969 licenses were first allocated by lottery for elk in F.L.C. as part of the first bull "calling season" held in the commercial forest. In 1970, when F.L.C. was officially declared a Wildlife Management Unit, 100 elk licenses were allocated by the draw system. The draw system for moose licenses was first used in 1973. Both elk and moose licenses have continued to be awarded by the draw system. Table 24 gives the number of licenses issued for elk and moose up to 1983.

Table 24. Number of Licenses for Moose and Elk Issued Under the Draw System Since Initiated.

	No. of Licenses Drawn	
Year	Elk	Moose
1969	75	-
1970	100	-
1971	125	-
1972	100	-
1973	125	
1974	125	
1975	175	125
1976	275	150
1977	275	200
1978	275	200
1979	275	200
1980	275	200
1981	275	200
1982	275	100
1983	275	100

(Ref. DPRR Big Game Draw Records, Regina, Sask.)

In 1982, the number of hunters applying for licenses exceeded the number available by more than 15:1 for elk and more than 9:1 for moose. This represents a sharp increase over 1979 when the respective

ratios were 10:1 and 6:1 for elk and moose. Until 1982, information on hunter success was collected by a mail questionnaire. This method is known to be biased (Cronan 1960; Bellrose 1947), so telephone surveys were done in 1982 and 1983 of all hunters drawn for elk and moose licences. The results are shown in Tables 25 and 26.

The hunter success rate for both elk and moose were low in 1982, at 15.5% and 17.8% respectively. Success rates in 1983, however, were about average at 24.9% for elk and 36.4% for moose.

Compared to elk and moose, little interest is shown in white-tailed deer hunting because it is difficult to hunt white-tailed deer in F.L.C. compared to other areas of the province. No accurate figures are available for white-tailed deer hunting success.

Black bear are hunted both in spring and fall by archers and rifle hunters. Most hunters use a tree stand and bait the bears with meat scraps. Regulations passed in 1983 require hunters using baits to fill out a miscellaneous use permit at the district office in whatever district the bait will be located. This permit must be posted adjacent to the bait. Because of this permit requirement, there is now a means of contacting individual bear hunters. The 59 individuals who had filled out permits for the 1983 spring and fall bear seasons in F.L.C. were surveyed by telephone in October of that year. Eleven of the hunters could not be reached and two had baits out but did not hunt. Of the 46 people who did hunt, 61% (28) were successful. All but one of the 28 bears were shot in the spring season.

Fur

Information obtained on furbearers from D.P.R.R. records indicates that nineteen species of furbearing mammals are known to exist in the F.L.C. area (Appendix 1). However, the rare cougar has not been recorded as having either been seen or taken in F.L.C. recently.

The fur resource accounted for a gross income of $3,877 in the 1981-82 season, $4,383.25 in 1982-83, and $3,674.50 in 1983-84 for Fur

Table 25. Telephone Questionnaire Results - Harvest Data for Elk and Moose Hunters in the Fort a la Corne Wildlife Management Unit.

	Animals Harvested			
	# Elk	%	# Moose	%
1982 Hunting Season:				
Number of licenses issued	275		102	
- hunters that did not hunt	11	4	7	6
- animals harvested - total	41		17	
- bulls	24	58.5	8	47
- cows	10	24.4	5	29
- calves	7	17.1	4	24
% overall success for the hunters who actually hunted	15.5%		17.8%	
1983 Hunting Season:				
Number of licenses issued	275		100	
- hunters that did not hunt	6		1	1
- animals harvested - total	67		36	
- bulls	34	50.7	11	30.5
- cows	23	34.3	18	50.0
- calves	10	15.0	7	19.5
% overall success for the hunters who actually hunted	24.9%		36.4%	

Table 26. Telephone Questionnaire Results - Harvest Data for the 1982 and 1983 Special Elk Seasons in the Fort a la Corne Wildlife Management Unit.

1982

Sex	Early Season (Aug. 30 - Sept. 18)	Late Season (Nov. 1 - Nov. 13)	Unknown	Total
Bulls	14	6	4	24
Cows	4	4	2	10
Calves	3	4	0	7
Total	21	14	6	41

1983

Sex	Early Season (Aug. 29 - Sept. 17)	Late Season (Nov. 7 - Nov. 19)	Unknown	Total
Bulls	18	16	-	34
Cows	7	16	-	23
Calves	2	8	-	10
Total	27	40	-	67

Note: Average days/elk harvested for the 1983 special season was 7.53.

Conservation Block P-85, which comprises all of F.L.C. north of the Saskatchewan River. The three major species harvested include red squirrel, muskrat, and beaver (Table 27). However, the greatest return to trappers has come from beaver, coyote, fox and mink. There are 10 trap areas in the P-85 zone and this entitles ten trappers and their helpers, one per licensee, to harvest furbearers in accordance with general guidelines and quotas. All of these trappers are from the James Smith Reserve. Most trappers have built cabins throughout their trapping areas.

Despite the potential numbers of trappers (20), P-85 has never been a very productive block, particularly when compared to other provincial harvest data (Strom pers. comm.). Variable open beaver quotas have been set for years to encourage heavier harvests of this predominant species, but it appears that this was only successful in 1979-80 when over 500 pelts were sold.

Game Birds

The harvest rate of ruffed grouse and spruce grouse is low and most of the birds harvested are taken opportunistically by big game hunters. Sharp-tailed grouse and grey partridge also occur in low numbers in restricted areas and are harvested along the forest fringe.

Harvest of waterfowl within F.L.C. is very low.

5.3.3 Elk Trapping, Marking and Monitoring

Two winters of elk trapping resulted in a total capture and marking of 59 elk. Of this total, 22 were radio collared with individually coded canvas neckbands. The description and current status of the trapped elk is given in Table 28.

Of the six traps that were constructed in 1982, four worked well throughout the winter. The fifth site was located near a field where heavy crop depredation had occurred in past years. No crop was left out in 1983, however, and the elk herd promptly shifted its winter

Table 27. Fur Harvest Totals for Trapping Block P-85 in Fort a la Corne From 1966 to 1982 (Fur Records, DPRR, Prince Albert, Sask.).

Years	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Bear	Badger	Timber Wolf	Rabbit	Raccoon
1966-67	61	5	-	9	-	-	15	394	-	1137	142	1	-	-	-	-
1967-68	152	5	-	-	-	-	15	180	-	1254	45	2	-	-	-	-
1968-69	299	35	-	27	-	-	24	392	-	2542	102	7	1	-	2	1
1969-70	225	36	-	11	6	-	33	934	-	2453	122	11	5	-	1	1
1970-71	277	8	-	11	4	-	4	584	1	621	59	9	-	1	-	-
1971-72	85	16	-	6	-	-	12	171	-	319	41	4	1	-	-	-
1972-73	137	18	3	18	3	-	36	1070	-	425	7	7	-	1	-	-
1973-74	72	10	-	7	1	-	5	67	-	77	14	-	-	-	-	1
1974-75	159	3	1	2	2	-	3	241	-	408	38	-	-	-	-	-
1975-76	234	11	-	4	-	-	28	1339	-	1206	32	4	-	-	-	-
1976-77	193	7	-	6	-	-	44	1557	-	864	39	-	1	-	-	1
1977-78	249	32	-	3	-	-	21	169	-	390	16	-	1	-	-	1
1978-79	343	23	-	17	-	-	38	265	-	1852	28	-	2	-	-	1
1979-80	597	2	-	5	-	-	57	1150	-	3335	32	-	1	-	-	2
1980-81	261	9	12	-	-	-	65	1783	-	1883	15	-	-	-	-	1
1981-82	135	4	-	3	-	-	8	51	-	459	1	-	1	-	-	-
TOTAL	3479	224	16	129	16	-	408	10347	1	19205	733	45	13	2	3	9
MEAN	217.4	14.0	1.1	8.06	1.1	-	25.5	646.7	.1	1200.3	45.8	3.0	.81	.1	.2	.6

Table 28. Description and Current Status of Elk Trapped in the Fort a la Corne Wildlife Management Unit During the Winters of 1982-83 and 1983-84 (Both Radio-Collared and Canvas-Collared Animals).

RADIO COLLARS

Sex (Age at Capture)	Capture Date	Capture Location	Pregnancy Check Results	Liver Fluke Test Result	Present Status (Last Date Seen)
Male (5½)	83-02-28	Smeaton South	N/A	+	Shot during 1983 hunting season.
Male (2½)	83-02-19	Feedsite	N/A	-	Shot during 1983 hunting season.
Male (10½)	83-03-28	Smeaton South	N/A	-	Unknown, collar broke & fell off.
Female (8½)	83-03-28	Southeast Trap	+	-	Alive
Female (6½)	83-03-27	Oxbow Trap	+	-	Alive
Male (½)	83-03-08	Feedsite Trap	N/A	-	Alive
Female (3½)	83-01-28	Feedsite Trap	+	-	Alive
Male (1½)	83-03-27	Oxbow Trap	N/A	+	Alive
Female (3½)	83-01-24	Southeast Trap	+	-	Alive
Female (6½)	83-03-02	Oxbow Trap	+	+	Unknown, suspected transmitter mal-function.
Female (3½)	83-03-06	Southeast Trap	+	-	Alive
Female (2½)	84-02-28	Southeast Trap	+		Alive
Female (2½)	84-03-04	Oxbow Trap	-		Alive
Female (1½)	84-03-22	Smeaton South	-		Alive
Male (½)	84-03-28	Southeast Trap	N/A		Alive
Male (7½)	84-03-28	Lars Trap	N/A		Alive
Female (6½)	84-02-22	Southeast Trap	+		Alive
Female (5½)	84-01-18	Oxbow Trap	+		Alive
Male (6½)	84-01-15	Smeaton South	N/A		Alive
Male (3½)	84-01-27	Lars Trap	N/A		Alive
Female (2½)	84-01-17	Smeaton South	+		Alive
Female (½)	84-01-14	Smeaton South	N/A		Alive

Table 28 (cont'd)

CANVAS COLLARS

Sex (Age at Capture)	Capture Date	Capture Location	Pregnancy Check Results	Liver Fluke Test Result	Present Status (Last Date Seen)
Female (½)	83-01-24	Southeast Trap	N/A	-	83-03-04
Female (11½)	83-03-14	Southeast Trap	+	-	84-03-16
Female (4½)	83-03-25	Southeast Trap	+	-	84-05-04
Female (½)	83-03-03	Feedsite Trap	N/A	-	84-03-16
Male (2½)	83-03-11	Feedsite Trap	N/A	+	Shot during 1983 hunting season.
Male (½)	83-03-26	Feedsite Trap	N/A	-	83-06-28
Female (3½)	83-03-07	Oxbow Trap	+	+	83-12-21
Female (4½)	83-03-07	Oxbow Trap	+	+	Unknown
Female (2½)	83-03-07	Oxbow Trap	+	+	Unknown
Female (1½)	83-03-27	Oxbow Trap	+	+	84-03-15
Male (½)	84-02-28	Southeast Trap	N/A		84-04-16
Male (½)	84-03-19	Southeast Trap	N/A		84-05-23
Female (2½)	83-12-22	Southeast Trap	+		84-04-16
Female (2½)	83-12-22	Southeast Trap	+		84-05-02
Female (9½)	83-12-22	Southeast Trap	+		84-05-03
Female (3½)	83-12-22	Southeast Trap	+		84-05-02
Female (½)	83-12-22	Southeast Trap	+		84-05-03
Male (½)	83-12-22	Southeast Trap	N/A		84-05-23
Male (2½)	83-12-20	Car Trap	N/A		84-05-03
Male (2½)	83-12-20	Car Trap	N/A		84-05-23
Female (3½)	84-03-04	Oxbow Trap	+		Unknown
Female (3½)	84-01-18	Oxbow Trap	+		84-03-30
Male (3½)	84-03-05	Lars Trap	N/A		Unknown
Female (½)	84-02-26	Smeaton South	N/A		84-04-16
Male (½)	84-01-28	Smeaton South	N/A		84-03-08
Female (6½)	84-02-26	Smeaton South	+		84-04-16
Male (1½)	84-01-28	Smeaton South	N/A		84-04-16
Male (½)	84-01-17	Smeaton South	N/A		84-03-22

Table 28 (cont'd)

Sex (Age at Capture)	Capture Date	Capture Location	Pregnancy Check Results	Liver Fluke Test Result	Present Status (Last Date Seen)
Female (3½)	84-01-28	Smeaton South	+		84-02-26
Female (2½)	84-01-28	Smeaton South	+		84-03-15
Female (3½)	84-01-28	Smeaton South	+		84-03-08
Male (1½)	84-01-28	Smeaton South	N/A		84-03-28
Female (½)	84-01-17	Smeaton South	N/A		84-03-22
Male (½)	84-01-17	Smeaton South	N/A		84-02-11
Female (4½)	84-01-17	Smeaton South	+		84-03-22
Female (½)	84-01-28	Smeaton South	N/A		84-05-02
Male (6½)	84-01-17	Smeaton South	N/A		Unknown

activity several miles east to feed on swathed flax. The other trap was never activated because a nearby gravel excavation operation appeared to drive elk away from the area. Two new traps constructed for the 1984 winter worked well. Animals showed no reluctance to repeatedly enter the holding pens and feed inside. Up to five elk were caught at one time in a trap, but the majority of captures involved only single animals. Trapping success was best when the quality of the alfalfa bait was good and the weather was cold.

All captured mature females except one were pregnant. Thirty-eight percent of animals captured in 1983 were infected with liver fluke; ticks were also present on most elk captured in March.

The preliminary observations of marked elk suggest that female and yearling elk in particular tend to travel considerable distances onto agricultural land away from the protection of the forest. In the spring, calving females tended to occupy areas with fresh water, heavy vegetative cover and good feeding sites. Little use was made of sandy jack pine and open timber stands. Elk preferred the River Valley and adjoining creek bottoms, the old river meanders, intermittent creek beds, and beaver dam meadows with abundant grass and sedge cover. Woody coulees with adjacent alfalfa or clover fields were frequently used by females and yearling elk herds during the spring of the year. The large bog areas in the northeastern and northwestern parts of the F.L.C. were also used. This data was used when drafting the Critical Wildlife Habitat Map.

Female and yearling elk appear to feed in agricultural fields during winter, spring, and summer. In addition a herd of elk has been continually seen near the dam site during spring and summer. The elk may be part of a residual herd that has been displaced by the recent clearing and land development along the river. Although the animals were captured along the eastern boundary of the F.L.C., they were near the dam site during spring calving.

The results suggest that river valley and adjacent coulees, creeks and agricultural fields are preferred habitat for elk for the majority of the year. Flooding all or part of this major riparian habi-

tat will likely result in increasing pressure on adjacent croplands.

Adult males tend to utilize very dense forests during most times of the year. More detailed description of all habitat use is provided in the critical habitat section.

Primary elk winter ranges were either mature aspen stands with dense diverse understory of preferred browse species or alluvial river terraces with early seral stage cover. Most of these key stands were adjacent to water or near agricultural fields. Often the predominant land system was a Lacustrine plain with fine loamy silt soils, or a dissected Lacustrine plain of moderately to steep terrain. The dominant overstory was trembling aspen, black poplar, some white birch and some white spruce. The understory was composed of saskatoon, hazelnut, dogwood, high bush-cranberry and immature aspen. These sites were usually well-drained. The least used categories coincided with the jack pine association, primarily associated with the Aeolian lands that exist over a large portion of F.L.C.

Based on observation data, the elk winter ranges were separated from the spring and calving ranges, and two categories of each type, based primarily on forage production capacity, were mapped separately. The Saskatchewan River Valley, particularly the south-facing slopes, the main meltwater channels and drainage channels including the alluvial terraces, and some of the old alluvial plains were identified as being critical winter and spring habitat.

The remainder of the forest is classified as intermediate. Its value to ungulates depends upon its location and its ability to provide shelter, travel lanes and critical food, especially in poor weather. The relative proximity to adjacent agricultural fields and winter-spring ranges also significantly influences its value.

6.0 SUMMARY

Environmental approval for the Francois-Finlay Dam at Nipawin was conditional on S.P.C. sponsoring a Wildlife Master Plan for F.L.C. This report presents the data collected by the study. A second shorter report will present the study recommendations as a Master Plan.

F.L.C. is a 1307.7 km^2 island of forest along the interface of the Southern Boreal Forest and Aspen Grove Parkland. The area is an important forest resource and a key wildlife habitat area. It is especially important for elk, supporting 15% of the provincial population, excluding P.A. National Park.

As part of the study a set of biophysical and critical wildlife habitat maps were prepared for the entire F.L.C. area. Critical habitat was identified for elk, moose, white-tailed deer, beaver, waterfowl, and sandhill cranes. Critical habitats are related to land system, vegetation, and land use as well as being based on observations of wildlife use.

During the study, 59 elk were trapped and marked. Twenty-two of these were equipped with radio transmitters. Monitoring these elk has provided information on movements and use of F.L.C. by elk. Continued monitoring will show the response of elk to habitat flooding as the reservoir fills.

REFERENCES CITED

Acton, C. J. and J. S. Clayton. 1968. Soil Capability for Agriculture Prince Albert Map Area - 73H. Canada Land Inventory.

Anderson, D. W. and J. G. Ellis. 1976. The Soils of the Provincial Forest Reserves in the Prince Albert Map Area. Saskatchewan Institute of Pedology. Pub. #SF3.

Anderson, H. G. 1976. The Future Forests of Saskatchewan. Ph.D. Thesis, University of Saskatchewan, Saskatoon, Sask.

Anweiler, Gary G. 1977. Annotated List of Birds of the Nipawin Area. Report for Sask. Power Corp. prepared by Donald Blood & Associates.

Atton, F. M. and J. J. Merkowsky. 1983. Atlas of Saskatchewan Fish. Fisheries Branch, Department of Parks and Renewable Resources, Regina, Sask. Technical Report 83-2.

Banfield, A. W. F. 1974. The Mammals of Canada. University of Toronto Press, Toronto, Ont.

Bellrose, Frank C., Jr. 1947. Analysis of Methods Used in Determining Game Kill. Journal Wildl. Mgmt. 11(2):105-119. The Wildlife Society, Washington, D.C.

Bergerud, Arthur T. and Frank Manuel. 1969. Aerial Winter Census of Moose in Central Newfoundland. Journal Wildl. Mgmt. 33(4):910-916. The Wildlife Society, Washington, D.C.

Blood, Donald A., Gary G. Anweiler, John E. Polson and Robert C. Godwin. 1977. Proposed Nipawin Hydroelectric Project: Wildlife and Natural History. Prepared for Sask. Power Corp., Regina, Sask.

Christiansen, E. A. 1979. The Wisconsinan Deglaciation of Southern Saskatchewan and Adjacent Areas. Can. Journal of Earth Sciences 16(4):913-938.

Cochrane, W. G. 1963. Sampling Techniques, 2nd Ed. Wiley, New York, N.Y.

Cook, F. R., 1970. Rare or Endangered Canadian Amphibians and Reptiles. The Can. Field-Nat. 84(1):9-16. Ottawa Field-Naturalists' Club, Ottawa, Canada.

Cranna, M. D. and J. S. Rowe. 1974. Natural Areas in Saskatchewan. National Research Council International Biological Programme - Conservation Terrestrial Summary Report. Saskatchewan Natural Area Survey. Saskatchewan Environment, Regina, Sask.

Cronan, John M. 1960. Prestige and Memory Bias in Hunter Kill Surveys. Rhode Island Div. of Fish and Game, Providence, R.I.

Evans, Charles D., Willard A. Troyer & Calvin J. Lensink. 1966. Aerial Census of Moose by Quadrat Sampling Units. Journal Wildlife Management 30(4):767-776, The Wildlife Society, Washington, D.C.

Flory, P. M. and A. P. Schmidt. 1982. Mapping of Critical Terrestrial Wildlife Habitat and Wetland Habitat in Agricultural Saskatchewan. p. 87-90. In Land/Wildlife Integration #2, Ecological Land Classification Series #17. Lands Directorate, Environment Canada.

Franson, H. Personal Communication. Associate Engineering Services Ltd. Regina, Saskatchewan.

Gasaway, William C. 1977. Moose Survey Procedures Development. Project Progress Report. Project W-17-9, Jobs 1.17R, 1.18R and 1.19R. Div. of Game, Dept. of Fish and Game, Juneau, Alaska.

Gollop, M. Personal Communication. Crop Damage Control Program, Wildlife Branch, Dept. of Parks and Renewable Resources, Saskatoon, Sask.

Hebert, D. M. and R. J. McFetridge. 1979. Chemical Immobilization of North American Game Animals. Alberta Recreation, Parks and Wildlife; Fish and Wildlife Division and Ministry of Environment; Fish and Wildlife Branch. Province of British Columbia.

Hildebrand, P. R. and J. O. Jacobsen. 1974. Helicopter Census of Moose in the Red Deer Lake Area, Manitoba. Resources Planning Branch. Manitoba Dept. Mines, Resources and Environmental Management. Winnipeg, Manitoba.

Hjertaas, Dale. 1979. Status of Some Saskatchewan Birds. Unpublished Report. Ecologist, Department of Parks and Renewable Resources, Regina, Saskatchewan.

Houston, Stuart C. and Maurice G. Street. 1959. The Birds of the Sask. River, Carlton to Cumberland. Special Pub. #2. Sask. Natural History Society. Regina, Sask.

Hudson, R. J. Personal Communication. Department of Animal Science, University of Alberta. Edmonton, Alberta.

Hunt, H. M. 1977. Browse Succession in an Aspen Forest. Saskatchewan Dept. of Tourism and Renewable Resources, Wildlife Technical Report 77-39.

Hunt, H. M. 1981. The Ecology and Status of Elk in Saskatchewan. Dept. of Tourism and Renewable Resources. Saskatoon, Sask. Wildlife Technical Report 81-1.

Hunt, H. M. and Phillips, D. 1978. Vegetation Changes After Clearcutting in the Mixedwood Forest and the Implications for Ungulates. Saskatchewan Dept. of Tourism and Renewable Resources. Technical Report 78-5.

Jacobsen, J. and R. Weatherill. 1975. Application of Quadrat and Strip Plot Sampling Techniques to an Aerial Census of White-tailed Deer in Manitoba's Interlake. Resources Planning Branch. Manitoba Dept. of Mines, Resources and Environmental Management. Winnipeg, Manitoba.

Jacobsen, J. O., H. Goulden, and I. Milliken. 1975. Application of Quadrat and Strip Plot Sampling Techniques to an Aerial Census of White-tailed Deer in Southwestern Manitoba. Dept. of Ren. Res. and Transportation Services. Winnipeg, Manitoba.

Josza, Joe. Personal Communication. Regional Forester. Prince Albert Region. Dept. of Parks and Renewable Resources. Prince Albert, Sask.

Kabzems, A., A. L. Kosowan and W. E. Harris, 1976. Mixedwood Section in an Ecological Perspective, Saskatchewan. Technical Bulletin. Dept. of Tourism and Renewable Resources, Regina, Saskatchewan.

Looman, J. and Best, K. F. 1979. Budd's Flora of the Canadian Prairie Provinces. Saskatchewan Research Branch, Agriculture Canada.

Lukiwski, G. Personal Communication. Parks Canada, Elk Island National Park, Alberta.

Lungull, E. Personal Communication. Resource Officer. Department of Parks and Renewable Resources. Nipawin, Saskatchewan.

Lynch, Gerry M. Personal Communication. Alberta Dept. of Recreation, Parks and Wildlife. Edmonton, Alberta.

Morrison, Helen. Personal Communication. Environmental Specialist (Biology). Environmental Programs, Sask. Power Corp., Regina, Saskatchewan.

Murray, R.E.G. and C. A. Mathews. 1974. Land Capability for Wildlife-Waterfowl. Prince Albert Map Area - 73H. Canada Land Inventory.

Neggers, C. 1982. Current Situation in Strategic Region #6. Dept. of Parks and Ren. Res., Forestry Branch, Prince Albert, Sask. Inter-Office Report.

Neggers, C. 1984. Fort a la Corne Provincial Forest: Forest Operating Plan. Department of Parks and Renewable Resources, Forestry Branch, Prince Albert, Saskatchewan. Unpublished Report.

Phillips, D. 1984. Fort a la Corne Management Plan. DPRR, Forestry Branch Unpublished Report.

Phillips, D. Personal Communication. Resource Officer. DPRR, Forestry Branch, Prince Albert, Sask.

Pipe, A. E. (Editor). 1982. Research. Volume #1. Environmental Baseline Study of the Sask. River, Saskatchewan in the Vicinity of Choiceland and the Forks. Geology, Hydrology, Water Quality, Aquatic Ecology, Vegetation and Forestry. Sask. Research Pub. #C-805-25-E-80.

Pipe, A. E. (Editor). 1982. Research. Volume #2. Environmental Baseline Study of the Sask. River, Saskatchewan in the Vicinity of Choiceland and the Forks. Wildlife Ecology, Archaeology and History, Recreation, Transportation, Socio-Economics. Sask. Research Pub. #C-805-25-E-80.

Polson, John E. and Rhonda L. Rasmussen. 1982. Additional Baseline Studies of Elk Use of the Saskatchewan River Valley - Nipawin to Thompson Island. Sask. Research Council Pub. #C-805-40-E-82.

Richards, J. H. and K. I. Fung (Eds.). 1969. Atlas of Saskatchewan. University of Saskatchewan, Saskatoon, Saskatchewan.

Rock, T. W. 1981. The Impact of Cattle on Vegetation and Wildlife in the Bronson Forest. Saskatchewan Tourism and Renewable Resources, Wildlife Branch, Saskatoon, Sask. Wildlife Technical Report 81-2.

Rock, T. W. and K. R. Scheelhaase. 1973. Land Capability for Wildlife - Ungulates. Prince Albert Map Area - 73H. Canada Land Inventory.

Rounds, Richard C. 1980. Aggregation Behaviour of Wapiti *(Cervus elaphus)* in Riding Mountain National Park, Manitoba. Canadian Field-Naturalist 94(2):148-153. Ottawa Field Naturalists' Club, Ottawa, Canada.

Saskatchewan Power Corporation. 1983. Facts About the Nipawin Hydro-electric Project. Preliminary Public Information Pamphlet.

Schmidt, A. Personal Communication. Regional Biologist - Melville Region. Department of Parks and Renewable Resources. Melville, Saskatchewan.

Siniff, Donald B. and Ronald O. Skoog. 1964. Aerial Censusing of Caribou Using the Stratified Random Sampling. Journal Wildlife Management. 28(2):391-401. The Wildlife Society, Washington, D.C.

Stewart, R. R. Personal Communication. Population Biologist. Department of Parks and Renewable Resources. Regina, Saskatchewan.

Strom, Harold. Personal Communication. Fur Administrator. Dept. of Parks and Renewable Resources. Prince Albert, Sask.

Toews, H. Personal Communication. Retired Sask. Dept. of Natural Resources Game Manager, Prince Albert, Saskatchewan.

Weins, T. Personal Communication. Crop Damage Control Program and Wildlife Development Fund. Department of Parks and Renewable Resources. Regina, Saskatchewan.

APPENDIX 1

Mammals found in the Fort a la Corne Wildlife Management Unit and a relative abundance rating for each.

Ratings Used

1 - common
2 - fairly common
3 - uncommon
4 - rare

Common Name	Scientific Name	Rating
SMALL MAMMALS		
Masked shrew	*Sorex cinereus*	1
Water shrew	*S. palustris*	3
Arctic shrew	*S. arcticus*	3
Pigmy shrew	*Microsorex hoyi*	3
Short-tailed shrew	*Blarina brevicauda*	3
Least chipmunk	*Eutamias minimus*	2
Richardson's ground squirrel	*Spermophilus richardsonii*	3
Thirteen-lined ground squirrel	*S. tridecemlineatus*	3
Franklin's ground squirrel	*S. franklinii*	3
Flying squirrel	*Glaucomys sabrinus*	4
Northern pocket gopher	*Thomomys talpoides*	2
Woodchuck	*Marmota monax*	3
Deer mouse	*Peromyscus maniculatus*	1
Gapper's red-backed vole	*Clethrionomys gapperi*	2
Bog lemming	*Synaptomys* spp.	3
Heather vole	*Phenacomys intermedius*	3
Meadow vole	*Microtus pennsylvanicus*	2
Meadow jumping mouse	*Zapus hudsonius*	3
Western jumping mouse	*Z. princeps*	2
Snowshoe hare	*Lepus americanus*	2
White-tailed jackrabbit	*L. townsendi*	3
Porcupine	*Erethizon dorsatum*	
FURBEARING MAMMALS		
Red squirrel	*Tamiasciurus hudsonicus*	2
Muskrat	*Ondatra zibethicus*	2
Beaver	*Castor canadensis*	1
Raccoon	*Procyon lotor*	4
Marten	*Martes americana*	3
Fisher	*M. pennanti*	3

Appendix 1 (cont'd)

Common Name	Scientific Name	Rating
FURBEARING MAMMALS (cont'd)		
Ermine	*Mustela erminea*	1
Long-tailed weasel	*M. frenata*	2
Least weasel	*M. nivalis*	3
Mink	*M. vison*	2
Badger	*Taxidea taxus*	3
Striped skunk	*Mephitis mephitis*	2
River otter	*Lontra canadensis*	4
Cougar	*Felis concolor*	has previously been recorded in area
Lynx	*Lynx lynx*	4
Red fox	*Vulpes vulpes*	3
Coyote	*Canis latrans*	2
Wolf	*C. lupis*	4
Black bear	*Ursus americanus*	2
UNGULATES		
Elk	*Cervus elaphus*	
Moose	*Alces alces*	
White-tailed deer	*Odocoileus virginianus*	
Mule deer	*O. hemionus*	

Nomenclature According To:

Banfield, A. W. F. 1974. The Mammals of Canada. University of Toronto Press, Toronto, Ontario.

APPENDIX 2

Summary of the bird species found in and adjacent to the Fort a la Corne Wildlife Management Unit, their relative abundance, and nesting frequency ratings where applicable.

Symbols Used

PR - permanent resident
SR - summer resident
SV - summer visitor
T - transient (spring and fall)
M - migrant
MV - winter visitor
V - year round visitor

P - probable nester in area
SA - nests in area surrounding Fort a la Corne
1 - common
2 - fairly common
3 - uncommon
4 - rare

Common Name	Scientific Name	Status	Nesting Frequency
LOONS (order Gaviiformes)			
Common loon	*Gavia immer*	SR/T 2	4
Arctic loon	*G. arctica*	Only 1 historical record	
GREBES (order Podicipediformes)			
Red-necked grebe	*Podiceps grisegena*	T 2	
Horned grebe	*P. auritus*	M 1	
Eared grebe	*P. nigricollis*	M 3	
Western grebe	*Aechmophorus occidentalis*	T/SV 2	
Pied-billed grebe	*Podilymbus podiceps*	M 3	
PELICANS AND CORMORANTS (order Pelecaniformes)			
American white pelican	*Pelecanus erythrorhychos*	SV/T 2	
Double-crested cormorant	*Phalacrocorax auritus*	M 2	
HERONS AND BITTERNS (order Ciconiiformes)			
Great blue heron	*Ardea herodias*	SR 1	
American bittern	*Botaurus lentiginosus*	SR 3	

Appendix 2 (cont'd)

Common Name	Scientific Name	Status	Nesting Frequency
SWANS, GEESE AND DUCKS (order Anseriformes)			
Tundra swan	*Cygnus columbianus*	M 2	
Canada goose	*Branta canadensis*	T/SV 1	SA 3
Greater white-fronted goose	*Anser albifrons*	M 2	
Snow goose	*Chen caerulescens*	M 3	
Ross' goose	*C. rossii*	M 3	
Mallard	*Anas platyrhynchos*	SR/T 1	2
Gadwall	*A. strepera*	SV/M 2	
American wigeon	*A. americana*	SR 1	2
Northern pintail	*A. acuta*	M/SR 2	SA 3
American black duck	*A. rubripes*	T/SV 3	
Green-winged teal	*A. crecca*	SR 1	2
Blue-winged Teal	*A. discors*	SR 1	2
Northern shoveler	*A. clypeata*	M/SV 2	
Wood duck	*Aix sponsa*	SV 4	
Redhead	*Aythya americana*	M 2	
Canvasback	*A. valisineria*	M 2	
Ring-necked duck	*A. collaris*	M 2	
Lesser scaup	*A. affinis*	M 1	
Common goldeneye	*Bucephala clangula*	SR 1	1
Bufflehead	*B. albeola*	SR/M 2	3
Oldsquaw	*Clangula hyemalis*	M 4	
White-winged scoter	*Melanitta fusca*	T 4	
Surf scoter	*M. perspicillata*	M 3	
Black scoter	*M. nigra*	T 3	
Ruddy duck	*Oxyura jamaicensis*	M 3	
Common merganser	*Mergus merganser*	SR 1	1
Red-breasted merganser	*M. serrator*	SR/M 3	3
VULTURES AND HAWKS (order Falconiformes)			
Turkey vulture	*Cathartes aura*	SR 2	P 3
Northern goshawk	*Accipiter gentilis*	PR 3	P 4
Sharp-shinned hawk	*A. striatus*	SR 3	2
Cooper's hawk	*A. cooperii*	SR 3	2
Red-tailed hawk	*Buteo jamaicensis*	SR 1	1
Broad-winged hawk	*B. platypterus*	SR 2	3
Swainson's hawk	*B. swainsoni*	4	
Rough-legged hawk	*B. lagopus*	T 2	
Ferruginous hawk	*B. regalis*	SV 2	
Northern harrier	*Circus cyaneus*	SR/M 3	3
Gyrfalcon	*Falco rusticolus*	4	
Prairie falcon	*F. mexicanus*	SR 3	4
Peregrine falcon	*F. peregrinus*	M 3	

Appendix 2 (cont'd)

Common Name	Scientific Name	Status	Nesting Frequency
VULTURES AND HAWKS (cont'd)			
Merlin	*F. columbarius*	SR 2	3
American kestrel	*F. sparverius*	SR 1	1
Osprey	*Pandion haliaetus*	SR 3	4
Golden eagle	*Aquila chrysaetos*	M/WV 3	
Bald eagle	*Haliaeetus leucocephalus*		one previous nest record
OWLS (order Strigiformes)			
Great horned owl	*Bubo virginianus*	PR 1	2
Snowy owl	*Nyctea scandiaca*	WV 2	
Great grey owl	*Strix nebulosa*	PR 2	P 4
Northern hawk-owl	*Surnia ulula*	WV 2	
Burrowing owl	*Athene cunicularia*	4	
Long-eared owl	*Asio otus*	4	4
Short-eared owl	*A. flammeus*	SR 3	
Boreal Owl	*Aegolius funereus*	WV 2	
Northern saw-whet owl	*A. acadicus*	4	4
NIGHTHAWKS (order Caprimulgiformes)			
Whip-poor-will	*Caprimulgus vociferus*	SR 3	
Common nighthawk	*Chordeiles minor*	SR 2	2
GROUSE AND PHEASANTS (order Galliformes)			
Ruffed grouse	*Bonasa umbellus*	PR 1	1
Spruce grouse	*Dendragapus canadensis*	PR 2	2
Sharp-tailed grouse	*Tympanuchus phasianellus*	PR 3	SA 3
Gray partridge	*Perdix perdix*	PR 3	SA 4
Willow ptarmigan	*Lagopus lagopus*	WV 4	
Ring-necked pheasant	*Phasianus colchicus*	4	
MARSH BIRDS (order Gruiformes)			
Whooping crane	*Grus americana*	M4	
Sandhill crane	*G. canadensis*	M/SR 1	3
Virginia rail	*Rallus limicola*	SR 3	
Sora	*Porzana carolina*	SR 1	3
American coot	*Fulica americana*	M 1	
SHOREBIRDS, GULLS AND TERNS (order Charadriiformes)			
Semipalmated plover	*Charadrius semipalmatus*	M 3	

Appendix 2 (cont'd)

Common Name	Scientific Name	Status	Nesting Frequency
SHOREBIRDS, BULLS AND TERNS (cont'd)			
Piping plover	*C. melodus*	SR 3	4
Killdeer	*C. vociferus*	SR 1	2
Lesser golden-plover	*Pluvialis dominica*	M 2	
Black-bellied plover	*P. squatarola*	M 3	
Ruddy turnstone	*Arenaria interpres*	M 3	
Common snipe	*Gallinago gallinago*	SR/T 3	3
Whimbrel	*Numenius phaeopus*	4	
Upland sandpiper	*Bartramia longicauda*	SR 3	
Spotted sandpiper	*Actitis macularia*	SR 1	2
Solitary sandpiper	*Tringa solitaria*	SR 2	4
Greater yellowlegs	*T. melanoleuca*	T 1	
Lesser yellowlegs	*T. flavipes*	T 1	
Willet	*Catoptrophorus semipalmatus*	SV 3	
Pectoral sandpiper	*Calidris melanotos*	M 3	
White-rumped sandpiper	*C. fuscicollis*	4	
Baird's sandpiper	*C. bairdii*	T 3	
Least sandpiper	*C. minutilla*	T 3	
Semipalmated sandpiper	*C. pusilla*	T 2	
Stilt sandpiper	*C. himantopus*	T 3	
Sanderling	*C. alba*	T 3	
Buff-breasted sandpiper	*Tryngites subruficollis*	M 3	
Dunlin	*Calidris alpina*	4	
Marbled godwit	*Limosa fedoa*	SV 3	
Hudsonian godwit	*L. haemastica*	T 3	
Dowitchers	*Limnodromus* spp.	T 3	
American avocet	*Recurvirostra americana*	4	
Wilson's phalarope	*Phalaropus tricolor*	SR 2	
Red-necked phalarope	*P. lobatus*	T 3	
Parasitic jaeger	*Stercorarius parasiticus*	T 3	
Herring gull	*Larus argentatus*	T/SV 2	
California gull	*L. californicus*	SV 2	
Ring-billed gull	*L. delawarensis*	T/SV 1	
Franklin's gull	*L. pipixcan*	M/SV 1	
Bonaparte's gull	*L. philadelphia*	M/SV 2	
Forster's tern	*Sterna forsteri*	M/SV 1	
Common tern	*S. hirundo*	M/SV 2	
Caspian tern	*S. caspia*	SV 1	
Black tern	*Chlidonias niger*	M/SV 1	

Appendix 2 (cont'd)

Common Name	Scientific Name	Status	Nesting Frequency
PIGEONS AND DOVES (order Columbiformes)			
Rock dove	*Columba livia*	PR 2	SA 3
Mourning dove	*Zenaida macroura*	SR 1	2
CUCKOOS (order Cuculiformes)			
Black-billed cuckoo	*Coccyzus erythropthalmus*	3	
HUMMINGBIRDS (order Apodiformes)			
Ruby-throated hummingbird	*Archilochus colubris*	SR 3	3
KINGFISHERS (order Coraciiformes)			
Belted kingfisher	*Ceryle alcyon*	SR 2	2
WOODPECKERS (order Piciformes)			
Northern flicker	*Colaptes auratus*	SR 1	1
Pileated woodpecker	*Dryocopus pileatus*	PR 2	3
Red-headed woodpecker	*Melanerpes erythrocephalus*	V 3	
Lewis' woodpecker	*M. lewis*	4	
Hairy woodpecker	*Picoides villosus*	PR 1	1
Downy woodpecker	*D. pubescens*	PR 2	3
Black-backed woodpecker	*P. arcticus*	WV 3	
Three-toed woodpecker	*P. tridactylus*	PR 3	4
Yellow-bellied sapsucker	*Sphyrapicus varius*	SR 1	1
PERCHING BIRDS (order Passeriformes)			
Eastern kingbird	*Tyrannus tyrannus*	SR 2	3
Western kingbird	*T. verticalis*	SR 3	3
Great crested flycatcher	*Myiarchus crinitus*	SR 2	3
Eastern phoebe	*Sayornis phoebe*	SR 1	2
Yellow-bellied flycatcher	*Empidonax flaviventris*	SR 3	4
Alder flycatcher	*E. alnorum*	SR 1	1
Least flycatcher	*E. minimus*	SR 1	1
Olive-sided flycatcher	*Cantopus borealis*	SR 2	3
Western wood-peewee	*C. sordidulus*	SR 3	4

Appendix 2 (cont'd)

Common Name	Scientific Name	Status	Nesting Frequency
Horned lark	*Eremophila alpestris*	SR/M 1	
Tree swallow	*Tachycineta bicolor*	SR 1	2
Bank swallow	*Riparia riparia*	SR 1	1
Cliff swallow	*Hirundo pyrrhonota*	SR 1	1
Barn swallow	*H. rustica*	SR 2	SA 2
Purple martin	*Progne subis*	SR 3	SA 3
Gray jay	*Perisoreus canadensis*	PR 1	3
Blue jay	*Cyanocitta cristata*	PR 2	2
Black-billed magpie	*Pica pica*	PR 1	2
Common raven	*Corvus corax*	PR 1	2
American crow	*C. brachyrhynchos*	SR 1	2
Black-capped chickadee	*Parus atricapillus*	PR 1	1
Boreal chickadee	*P. hudsonicus*	PR 2	3
White-breasted nuthatch	*Sitta carolinensis*	PR 2	4
Red-breasted nuthatch	*S. canadensis*	SR 1	2
Brown creeper	*Certhia americana*	SR 3	4
House wren	*Troglodytes aedon*	SR 2	SA 3
Winter wren	*T. troglodytes*	M 3	
Marsh wren	*Cistothorus palustris*	SR 3	
Sedge wren	*C. platensis*	SR 3	1
Gray catbird	*Dumetella carolinensis*	SR 1	
Brown thrasher	*Toxostoma rufum*	SV 3	
American robin	*Turdus migratorius*	SR 1	1
Hermit thrush	*Catharus guttatus*	M/SR 1	
Swainson's thrush	*C. ustulatus*	SR 1	2
Grey-cheeked thrush	*C. minimus*	T 1	
Veery	*C. fuscescens*	SR 1	2
Eastern bluebird	*Sialia sialis*	4	
Mountain bluebird	*S. currucoides*	SR 2	SA 3
Townsend's solitaire	*Myadestes townsendi*	4	
Golden-crowned kinglet	*Regulus satrapa*	M 3	
Ruby-crowned kinglet	*R. calendula*	SR 1	2
Water pipit	*Anthus spinoletta*	T 1	
Sprague's pipit	*A. spragueii*	SR 3	
Bohemian waxwing	*Bombycilla garrulus*	WV 2	
Cedar waxwing	*B. cedrorum*	SR 1	1
Northern shrike	*Lanius excubitor*	WV 2	
Loggerhead shrike	*L. ludovicianus*	SR 2	SA 4
European starling	*Sturnus vulgaris*	SR 3	3
Yellow-throated vireo	*Vireo flavifrons*	M 3	
Solitary vireo	*V. solitarius*	SR 2	3
Red-eyed vireo	*V. olivaceus*	SR 1	1
Philadelphia vireo	*V. philadelphicus*	SR 2	3

Appendix 2 (cont'd)

Common Name	Scientific Name	Status	Nesting Frequency
Warbling vireo	*V. gilvus*	SR 3	
Black-and-white warbler	*Mniotilta varia*	SR 3	3
Tennessee warbler	*Vermivora peregrina*	SR 2	2
Orange-crowned warbler	*V. celata*	SR 3	4
Nashville warbler	*V. ruficapilla*	SR 3	
Yellow warbler	*Dendroica petechia*	SR 1	1
Magnolia warbler	*D. magnolia*	SR 2	3
Cape May warbler	*D. tigrina*	M 1/SR 3	4
Yellow-rumped warbler	*D. coronata*	SR 1	2
Black-throated green warbler	*D. virens*	SR 2	3
Blackburnian warbler	*D. fusca*	SR 2	3
Chestnut-sided warbler	*D. pensylvanica*	SR 1	2
Bay-breasted warbler	*D. castanea*	M 1/SR 3	4
Blackpoll warbler	*D. striata*	M 1	
Palm warbler	*D. palmarum*	M/SR 2	
Ovenbird	*Seiurus aurocapillus*	SR 1	1
Northern waterthrush	*S. noveboracensis*	SR 2	2
Connecticut warbler	*Oporornis agilis*	SR 3	4
Mourning warbler	*O. philadelphia*	SR 1	1
Wilson's warbler	*Wilsonia pusilla*	M/SR 3	4
Canada warbler	*W. canadensis*	SR 2	2
Common yellowthroat	*Geothlypis trichas*	SR 1	1
American redstart	*Setophaga ruticilla*	SR 1	1
House sparrow	*Passer domesticus*	PR 1	SA 2
Bobolink	*Dolichonyx oryzivorus*	4	
Western meadowlark	*Sturnella neglecta*	SR 2	SA 3
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	SR 2	3
Red-winged blackbird	*Agelaius phoeniceus*	SR 2	2
Rusty blackbird	*Euphagus carolinus*	M 3	
Brewer's blackbird	*E. cyanocephalus*	SR 3	4
Common grackle	*Quiscalus quiscula*	SR 1	SA 3
Brown-headed cowbird	*Molothrus ater*	SR 1	1
Northern oriole	*Icterus galbula*	SR 1	3
Western tanager	*Piranga ludoviciana*	SR 3	3
Scarlet tanager	*P. olivacea*	SR 3	4
Rose-breasted grosbeak	*Pheucticus ludovicianus*	SR 1	1
Evening grosbeak	*Coccothraustes vespertinus*	WV 1/SR 3	
Pine grosbeak	*Pinicola enucleator*	WV 3	
Indigo bunting	*Passerina cyanea*	4	
Purple finch	*Carpodacus purpureus*	SR 1	2

Appendix 2 (cont'd)

Common Name	Scientific Name	Status	Nesting Frequency
Rosy finch	*Leucosticte arctoa*	4	
Hoary redpoll	*Carduelis hornemanni*	WV 3	
Common redpoll	*C. flammea*	WV 1	
Pine siskin	*C. pinus*	SV 1	
American goldfinch	*C. tristis*	SR 2	2
Red crossbill	*Loxia curvirostra*	V 3	
White-winged crossbill	*L. leucoptera*	V 3	
Lark bunting	*Calamospiza melanocorys*	4	
Savannah sparrow	*Passerculus sandwichensis*	4	
Baird's sparrow	*Ammodramus bardii*	SR 3	
Le Conte's sparrow	*A. leconteii*	SR 3	4
Vesper sparrow	*Pooecetes gramineus*	SR 2	2
American tree sparrow	*Spizella arborea*	T 1	
Chipping sparrow	*S. passerina*	SR 1	1
Clay-colored sparrow	*S. pallida*	SR 1	1
Harris' sparrow	*Zonotrichia querula*	T 1	
White-crowned sparrow	*Z. leucophrys*	T 1	
White-throated sparrow	*Z. albicollis*	SR 1	1
Fox sparrow	*Passerella iliaca*	SR 2	4
Lincoln's sparrow	*Melospiza lincolnii*	SR 2	4
Swamp sparrow	*M. georgiana*	SR 3	
Song sparrow	*M. melodia*	SR 1	1
Dark-eyed junco	*Junco hyemalis*	SR 1	2
Lapland longspur	*Calcarius lapponicus*	M 1	
Snow bunting	*Plectrophenax nivalis*	WV 1	

Ref: Anweiler, Gary G. 1977. Annotated List of Birds of the Nipawin Area. Report for Sask. Power Corp. prepared by Donald Blood and Associates.

Hjertaas, Dale. 1979. Status of Some Saskatchewan Birds. Unpublished Report.

Houston, Stuart C. and Maurice G. Street. 1959. The Birds of the Saskatchewan River, Carlton to Cumberland. Special Pub #2. Sask. Natural History Society. Regina, Sask.

Nomenclature Based On:

American Ornithologists' Union. 1982. Check-list of North American Birds, Supplement to The Auk. Vol. 99, No. 3. A.O.U. Washington, D.C.

APPENDIX 3

Reptiles and amphibians that are expected to be present and are present in the Fort a la Corne Wildlife Management Unit.

Common Name	Scientific Name	Previously Recorded
AMPHIBIANS		
Canadian toad	*Bufo hemiophrys*	*
Wood frog	*Rana sylvatica*	*
Leopard frog	*R. pipiens*	*
Boreal chorus frog	*Pseudacris triseriata*	*
Tiger salamander	*Anbystoma tigrinum*	
REPTILES		
Common garter snake	*Thamnophis sirtalis*	*

Ref:

- list taken from Richard and Fung (1969), and Cook (1966).
- information to complete the list taken from personal observations and A. E. Pipe (1982b).

APPENDIX 4

Fish species found in the Saskatchewan River.

Common Name	Scientific Name
Walleye	*Stizostedion vitreum*
Sauger	*S. canadense*
Northern pike	*Esox lucius*
Goldeye	*Hiodon alosoides*
Mooneye	*Hiodon tergisus*
Lake sturgeon	*Acipenser fulvescens*
Yellow perch	*Perca flavescens*
Longnose sucker	*Catostomus catostomus*
White sucker	*C. commersoni*
Shorthead redhorse	*Moxostoma macrolepidotum*
Silver redhorse	*M. anisurum*
Quillback	*Carpiodes cyprinus*
Burbot	*Lota lota*
Flathead chub	*Hybopsis gracilis*
Spottail shiner	*Notropis hudsonius*
Emerald shiner	*N. atherinoides*
River shiner	*N. blennius*
Longnose dace	*Rhinichthys cataractae*
Pearl dace	*Semotilus margarita*
Spoonhead sculpin	*Cottus ricei*
Fathead minnow	*Pimephales promelas*
Lake whitefish	*Coregonus clupeaformis*
Lake chub	*Couesius plumbeus*
Northern redbelly dace	*Chrosomus eos*
Trout-perch	*Percopsis omiscomaycus*
Brook stickleback	*Culaea inconstans*
American eel	*Anguilla rostrata*
Rainbow trout	*Salmo gairdneri*
Brook trout	*Salvelinus fontinalis*

Ref: Atton F. M., and J. J. Merkowsky, 1983. Atlas of Saskatchewan Fish. Fisheries Branch, Department of Parks and Renewable Resources. Technical Report 83-2, Regina, Saskatchewan.

APPENDIX 5

Plant species referred to in the text.

Common Name	Scientific Name
TREES AND SHRUBS	
Jack pine	*Pinus banksiana*
Trembling aspen	*Populus tremuloides*
Balsam poplar	*P. balsamifera*
Black spruce	*Picea mariana*
White spruce	*P. glauca*
White birch	*Betula papyrifera*
Swamp birch	*B. glandulifera*
Speckled alder	*Alnus incana*
Green alder	*Alnus viridis* var. *sinuata*
Tamarack	*Larix laricina*
Blueberry	*Vaccinium myrtilloides*
Bearberry	*Arctostaphylos uva-ursi*
Canada buffaloberry	*Sheperdia canadensis*
Labrador tea	*Ledum palustre*
Willow	*Salix* spp.
Saskatoon	*Amelanchier alnifolia*
Choke cherry	*Prunus virginiana*
Rose	*Rosa* spp.
Balsam fir	*Abies balsamea*
High bush-cranberry	*Viburnum opulus*
Low bush-cranberry	*V. edule*
Spreading dogbane	*Apocynum androsaemifolium*
Twining honeysuckle	*Lonicera dioica*
Silverberry	*Eleaegnus commutata*
Pin cherry	*Prunus pensylvanica*
Shrubby cinquefoil	*Potentilla fruticosa*
Red-osier dogwood	*Cornus alba*
Snowberry	*Symphoricarpos albus*
Beaked hazelnut	*Corylus cornuta*
Dwarf mistletoe	*Arceuthobium americanum*
GRASSES	
Crested wheatgrass	*Agropyron cristatum*
Slender wheatgrass	*A. trachycaulum*
Fringed brome	*Bromus ciliatus*
Smooth brome	*B. inermis*
Wild rice	*Zizania aquatica*
Reed grass	*Calamagrostis* spp.

Appendix 5 (cont'd)

Common Name	Scientific Name
FORBS	
Sedges	*Carex* spp.
Arrow-leaved colt's-foot	*Petasites sagittatus*
Silverweed	*Potentilla anserina*
Field mint	*Mentha arvensis*
Bedstraw	*Galium* spp.
Twinflower	*Linnaea borealis*
Wild sarsaparilla	*Aralia nudicaulis*
Meadow-rue	*Thalictrum* spp.
Starflower	*Lithophragma* spp.
Wintergreen	*Pyrola* spp.
Bunchberry	*Cornus canadensis*
Fireweed	*Epilobium angustifolium*
Three-leaved Solomon's-seal	*Smilacina trifolia*
Stinging nettle	*Urtica dioica*
Smooth aster	*Aster laevis*
Bishop's-cap	*Mitella nuda*
Rushes	*Juncus* spp.
Cattail	*Typha* spp.
NON-SEED PLANTS	
Reindeer moss	*Cladonia* spp.
Feather moss	*Hylocomium splendens*
Sphagnum moss	*Sphagnum* spp.
Ground-pine	*Lycopodium obscurum*
Grape fern	*Botrychium simplex*
Ostrich fern	*Matteucia struthiopteris*
Horsetail	*Equisetum* spp.

Ref: Kabzems, A., A. L. Kosowan and W. E. Harris. 1976. Mixed-wood Section in an Ecological Perspective, Saskatchewan. Technical Bulletin, DTRR, Regina, Sask.

Nomenclature According To:

Looman, J. and Best, K. F. 1979. Budd's Flora of the Canadian Prairie Provinces. Saskatchewan Research Branch, Agriculture Canada.

I.D. SYSTEMS LTD.
Environmental and Socio-Economic Consultants

1025 Boychuk Drive
Saskatoon, Saskatchewan S7H 5B2
(306) 374-8383

APPENDIX 6

IDS

Letter of introduction regarding F.L.C. study to James Smith and Muskoday Bands.

April 28, 1982

Chief Issac Daniels
James Smith Indian Reserve
Box 680
Kinistino, Saskatchewan
S0J 1H0

Dear Chief Daniels:

This letter is to inform you of a study which will be carried out over the next two years in the area of the Fort a la Corne Wildlife Management Unit.

Saskatchewan Power Corporation is funding a master plan study of the Wildlife Management Unit as part of the mitigation for the impacts of the Nipawin Dam. I.D. Systems Ltd. of Saskatoon will manage the study, which will be carried out by the Wildlife Branch of Saskatchewan Department of Tourism and Renewable Resources.

The master plan study is designed to find out a number of things, including all the land types and areas of animal habitat in the Wildlife Management Unit, and how to avoid possible harmful effects of the dam on big game, bear, coyote, fox, other animals and birds. The study will also determine how best to maintain or increase wildlife populations and their use through different trapping and hunting practices, better forest management techniques, and schedules and regulations regarding increased recreation in the area.

Since there are a number of potential benefits and impacts which could affect you and your people, I would like to have the opportunity to meet with you to discuss the project and hear your concerns and suggestions. We feel that it is important to do so now and as the work goes on so that the plan will be as practical as possible. It will be impossible to develop a good wildlife management plan without knowing what the resource users' requirements are.

I'll be calling you shortly to see what your decision is.

Yours very truly,
I.D. SYSTEMS LTD.

W. K. Harper
General Manager

A Division of IDG
The Interdisciplinary Group
Vancouver, Calgary, Edmonton, Lloydminster, Saskatoon, Winnipeg and Grand Forks, N.D.

(An identical letter was sent to Chief David Knight of Muskoday Indian Reserve on April 28, 1982)

APPENDIX 7

Outline of F.L.C. project.

FORT A LA CORNE WILDLIFE MASTER PLAN

Department of Tourism and Renewable Resources

and

Saskatchewan Power Corporation

Background

In early 1981, Saskatchewan Power Corporation (SPC) obtained approval to construct a 252 MV hydroelectric development on the Saskatchewan River near Nipawin.

One of the commitments made by SPC at that time was to provide funding for the preparation of a comprehensive wildlife master plan for the Fort a la Corne Wildlife Management Unit, to be prepared in consultation with the Wildlife Branch of Saskatchewan Department of Tourism and Renewable Resources (DTRR). The purpose of preparing and implementing a wildlife master plan for this area is to help compensate for the loss of wildlife and wildlife habitat caused by the Nipawin hydroelectric development.

Master Plan Study

The consulting company of I.D. Systems Ltd., of Saskatoon, under the direction of J. M. Hnatiuk, has been commissioned to manage the master plan study.

The study is divided into three components: (1) ecological inventory and analysis; (2) big game inventories and population management; and (3) other wildlife inventories and population management.

The Ecological Inventory and Analysis will:

(1) map all of the Fort a la Corne Wildlife Management Unit according to land type;

(2) identify forest dominants, shrub layers and important or rare ground flora according to land type;

(3) identify fragile areas or critical wildlife habitat areas; and

Appendix 7 (cont'd)

(4) provide the basic framework to which everything else is related in the master plan.

The Big Game Inventories and Population Management study component will include inventories and population studies of elk, moose and deer. The work in this area will:

(1) identify populations and harvesting according to biophysical types;

(2) identify specific impacts from the hydroelectric development;

(3) identify potential techniques for maintaining ungulate populations and, if possible, increase populations and availability for hunting and observation through intensive management;

(4) identify potential depredation problems and means of amelioration;

(5) identify ways and means of co-operating with local Indian bands in management of the big game resource;

(6) identify forest management practices which are detrimental and those most beneficial to ungulate production and management; and

(7) result in a significant portion of the overall wildlife master plan.

Other Wildlife Inventories and Population Management study components will:

(1) develop the best possible estimate of bear, coyote, and fox densities;

(2) identify key habitat areas for the bear and carnivore species for the purposes of habitat maintenance and human use;

(3) assess the impact of present trapping and hunting on current populations and suggest changes necessary to maintain or increase populations and resource use;

(4) identify indigenous game birds, non-game and fur wildlife, related to land type and vegetation, with particular emphasis on eagles, ospreys, waterfowl, ruffed grouse, and other rare or unusual species;

(5) identify needed action to prevent or mitigate for the changes to bears and carnivores resulting from the hydroelectric development; and

Appendix 7 (cont'd)

(6) prepare reports necessary for inclusion of the wildlife master plan.

During the two year study period, a number of wildlife ecologists will be in the area gathering the data required for developing the wildlife master plan. We may require your co-operation and assistance in gathering locally important information. By working together, we hope to produce a master plan which will benefit all of us in managing the valuable wildlife resource in the Fort a la Corne Wildlife Management Unit.

The master plan will include identification of areas suitable for wildlife habitat enhancement and will outline future management activities such as manipulation of forest harvest schedules, reforestation, and seeding of sites to forage for wildlife feed during critical times of the year. Schedules and regulations to minimize the impact of increased recreational use of the area will also be designed.

Human developments often harm wildlife. However, with good management and planning, wildlife managers and SPC hope to reduce the negative impacts of the Nipawin hydroelectric development on the wildlife resources of the Fort a la Corne Wildlife Management Unit.

If you have any questions about the Fort a la Corne Wildlife Master Plan study, or if you wish to offer suggestions, please contact:

I.D. Systems Ltd.
Environmental and Socio-Economic Consultants,
1025 Boychuk Drive,
Saskatoon, Saskatchewan,
S7H 5B2.

APPENDIX 8

Field Data For Fort a la Corne

Map Sheet _____ Site No. _____

Location: General _____

Specific (U.T.M.) _____

Land System _____ Date _____

Observer _____ Photo No. _____

General:

Description - Tree Stand Component

1. Overstory: Open ___, Closed ___

Young ___, Matured ___, Decadent ___

Dom. spp.

Other spp.

Site preferences of above -

Wildlife use and wildlife observations -

2. Understory: Overall - Dense (80-100%) ___, Mod. (50-80) ___,

Light (30-50) ___, Sparse (0-30) ___

Dom. Strata - Tall (6 ft+) ___, Med. (3-6 ft) ___,

Low (3 ft-) ___.

(a) Tall Shrubs: (6 ft+) Density - _____

Dom. spp.

Subdom. spp.

Appendix 8 (cont'd)

Other spp.

Site preferences of above -

(b) Med. Shrubs: (3-6 ft) Density - _____

Dom. spp.

Subdom. spp.

Other spp.

Site preferences of above -

(c) Low Shrubs: (3 ft-) Density - _____

Dom. spp.

Subdom. spp.

Other spp.

Site preferences of above -

Wildlife use and wildlife observations -

3. (a) Forbs:

Dom. spp.

Other spp.

Site Preferences -

Appendix 8 (cont'd)

Wildlife use and wildlife observations -

(b) Native Grasses:

Dom. spp.

Other spp.

(c) Sedges, Mosses:

Dom. spp.

Other spp.

Depth of organic layer -

Wildlife use of wildlife observations -

* For page 3 - identify as many species as you can. Do not hesitate to bring specimens back into the office to key out.

APPENDIX 9a

Letter of response from the James Smith Indian band.

May 22, 1984

Mr. J. M. Hnatiuk
Manager
I.D. Systems Ltd.
#15 Innovation Blvd.
Saskatoon, Sask.
S7N 2X8

Re: Fort a la Corne Wildlife Master Plan Nipawin Hydroelectric Project

Dear Mr. Hnatiuk:

We understand that your company has been commissioned by Saskatchewan Power Corporation to manage the above study.

We are also aware that this study is to be prepared in consultation with the Wildlife Branch of the Department of Tourism and Renewable Resources.

We the James Smith Band wish to participate as equal partners with I.D. Systems and the Wildlife Branch of D.T.R.R. in the preparation and eventual implementation of the plan.

As we understand it the effective implementation of such a plan will help compensate for the loss of wildlife and wildlife habitat as a result of the Nipawin Hydroelectric Project.

We are not opposed to the Nipawin Project, we wish, instead, to maximize the benefits while minimizing the negative impacts. The loss of our wildlife, however, will definitely have a negative impact on our traditional way of life. This affected area has been our traditional hunting grounds, since long before the arrival of the Europeans. It is still our traditional hunting grounds.

We have many valid concerns, particularly in the Fort a la Corne Forest. For example this area contains 10 trapping blocks. Each of these blocks will have at least two people - the trapper and his wife or older son. Because of the high unemployment of our reserve we can estimate that these 20 people reflect approximately 13% of our working population.

../2

Appendix 9a (cont'd)

I am telling you this so that you can see how important an effective Wildlife Management Plan means to us. As partners in preparing the Plan we would support research:

A. On the formation of Trapping Association that would employ a local native person to implement a Fur Management Plan.

B. On a Resource Use Management Team that would include Indian Conservation Officers to enforce the regulations for resource use.

C. To hire and train Indian people in the Management of Resource Use so that eventually the entire responsibility of managing the use of our resources in this area is in the hands of Indian people and ...

D. On funding projects such as Wild Rice Farms, Animal Farms and Wildlife Sanctuary.

These are just four areas we would wish to research, no doubt others will come up. We are determined to improve our economic situation. We see this Wildlife Master Plan as an opportunity. That is why we wish to be a partner in its development. The James Smith Band was not considered in the inquiry or the study of the Nipawin Project. To date we have not felt any of the positive impacts of this project.

Nevertheless, we have recognized that the reservoir can be designed to attract the tourist dollar.

We have already started studies on developing a Tourist Resort and Recreation Area. We know the value of the historical sites and especially our 47 prehistoric sites. We believe that as a partner in the preparation of the Wildlife Master Plan we could also contribute to the development of a Recreation Plan.

It will be vital to us to make sure the competition for the tourist dollar is fair for everyone.

If the negative impacts on our Traditional Hunting Grounds are the only result of the Nipawin Project we will certainly negotiate more compensation than a Wildlife Plan.

We believe we can justifiably expect:

- business and employment opportunities at the project site and in the operation and management of the Wildlife Management Plan and

../3

Appendix 9a (cont'd)

- not only immediate compensation for the animals and other resources lost but also a reasonable projection of future lost opportunities.

I am sending a copy of this letter to Sask. Power Corporation and D.T.R.R. so that we can expedite the process. I will be looking forward to discussing this partnership in substantive details in the near future.

Yours truly,

Chief Angus McLean
James Smith Band.

MM:ms
cc: Sask. Power Corp.
D.T.R.R.

APPENDIX 9b

Letter of response from the Muskoday Indian band.

John Smith Band
Muskoday Reserve
Box 9
Birch Hills, Saskatchewan Phone 764-1282
764-1831

May 16, 1984

Mr. J. M. Hnatiuk
Manager
I.D. Systems Ltd.
#15 Innovation Boulevard
Saskatoon, Saskatchewan
S7N 2X8

Re: John Smith Band and Council - Fort a la Corne Wildlife Master Plan

The John Smith Council and Band are aware of the current construction by the Saskatchewan Power Corporation (S.P.C.) of the Nipawin Hydro project and associated Codette Reservoir. Furthermore, your company, I.D. Systems Ltd., has informed us that S.P.C. has made a commitment to help prepare a comprehensive wildlife master plan for the Fort a la Corne Wildlife Management Unit. The plan is to be prepared with the help of the Department of Parks and Renewable Resources. We understand that the purpose of preparing and implementing a wildlife master plan for this area is to help compensate for the loss of wildlife and wildlife habitat by the Nipawin hydroelectric development (see attached information sheet).

The information indicates that the study is divided into three components. Although we are interested in all three we are most interested in the second and third, "The Big Game Inventories and Population Management", and "Other Wildlife Inventories and Population Management" respectively. More specifically we are interested in point 2(5) "Identify ways and means of co-operating with local Indian Bands in management of the big game resource", and part of 3(3) Assess the impact of present hunting on current populations and suggest changes necessary to maintain or increase population and resource use.

In summary, since the Fort a la Corne fulfills our many needs including food and recreation, we would like to be part of its overall management strategies. We would therefore like you to consider the following points in the Wildlife Master Plan which you are preparing:

../2

Appendix 9b (cont'd)

1. Indians from within Saskatchewan and outside use the Fort a la Corne area wildlife for food. The John Smith Indian Band, because of its proximity rely on the Fort as part of their food supply. The Codette reservoir will have a direct impact on the Fort a la Corne area by flooding valuable river valley wildlife habitat. The result of the flooding will be less habitat available for wildlife upon which we depend as a food supply. The direct loss of the last wildlife habitat is of prime concern to John Smith. As a compensation to the direct loss to our people we would like to have input into future natural resource management and planning. In this regard we recommend that a resource use management team be established and that members of our reserve should form part of that management team. The management team could include Indian Conservation Officers to help enforce laws that the management team establishes. The management team could also consider creating employment for local people by investigating the possibility of guiding and outfitting of recreational hunters, game ranching and other job creating opportunities;

2. We note in your information sheet (attached) that future mitigation will include "management activities such as manipulation of forest harvest schedules, reforestation, and seeding of sites to forage for wildlife feed during critical times of the year". We would urge you to hire and train local John Smith people to help do these tasks; and

3. The formation of the local Codette Reservoir, like Tobin Lake, will attract outside recreationists (tourists). The influx of the outside people if uncontrolled will have a negative impact in the Fort a la Corne area. Since the Fort a la Corne area could be developed as an attraction (campgrounds, public wildlife viewing sites, habitat manipulation experiments, winter and summer land and water based recreations) John Smith Reserve would like to have input into these developments. We therefore urge you to help find some of these developments so that we concentrate and therefore control the expected influx of expected tourists. Your funding will assist us to employ local people as well as protect the Fort a la Corne area from further abuse.

We on behalf of John Smith would urge you to include our concerns in your wildlife master plan. If you have any questions please contact us.

Respectfully submitted by/

Mervin Bear, Chief
John Smith Band
Muskoday Reserve.